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# ANALYSIS OF CONSTRUCTION WORKLOAD RESPONSIBILITY, U.S. NAVAL FACILITIES ENGINEERING COMMAND

## by

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### Thesis

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# ANALYSIS OF CONSTRUCTION WORKLOAD RESPONSIBILITY, U.S. NAVAL FACILITIES ENGINEERING COMMAND

**Approved by Supervising Committee:** 

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ames A. Broaddus

# **Dedication**

To my wife and best friend, Ana and my two sons, Gavin and Adrian with love and appreciation.

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August 11, 2003

### **Abstract**

# ANALYSIS OF CONSTRUCTION WORKLOAD RESPONSIBILITY, U.S. NAVAL FACILITIES ENGINEERING COMMAND

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The University of Texas at Austin, 2003

SUPERVISOR: Richard L. Tucker

This thesis analyzes workload responsibility of construction administration personnel within the U. S. Naval Facilities Engineering Command (NAVFAC) and compares to three industry owner organizations (two public and one private). Specifically, an analysis of construction workload responsibility for three NAVFAC Field Office positions: Project Manager, Contract Specialist, and Quality Assurance Representative, is compared to industry personnel with equivalent positions and/or responsibilities. Additionally, the author discusses factors that influence the level of responsibility for the organizations' respective positions. The period of study is fiscal years 2000 through 2002. A questionnaire was utilized together with personal and phone interviews to complete this study.

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## **CHAPTER 1: INTRODUCTION**

The U. S. Naval Facilities Engineering Command (NAVFAC) plays an important role in the support of U.S. Navy and Marine Corps forces. NAVFAC's mission is to meet its client's need in the areas of facilities, installations, environmental, contingency engineering, and outsourcing. NAVFAC is composed of more than 16,000 military and civilian people and its annual volume of business is more than \$8 billion (GlobalSecurity.org). One of NAVFAC's vital services to its clients is the administration of post-award construction contracts. The Field Office, also known as the Resident Officer in Charge of Construction (ROICC) office, is NAVFAC's field contracting office composed of Navy Civil Engineer Corps officers and civilians responsible for construction, design, and facilities service contract administration. There are currently 90 ROICC offices in the continental U.S. and overseas.

Similar to construction administration departments in industry, ROICC office personnel administer construction contracts and are responsible for the planning, scheduling, monitoring, and completion of projects. For the purposes of this study, an "industry organization" refers to any non-federal organization. NAVFAC developed the ROICC Office Model to ensure the appropriate staffing, skill mix, and technical support from NAVFAC Engineering Field Divisions/Activities will provide the most efficient service to its clients.

The structure and mission of every commercial, federal and public organization is unique. Uniqueness is also inherent in the organization's construction administration department: staffing, skill mix, contract processes, accountability and level of responsibility. NAVFAC is in a continual process to streamline its organization and assure efficient and effective services. Business case analyses have been performed to compare NAVFAC's business activities, specifically base operations and maintenance, to the commercial sector. However, owner construction administration functions (e.g. inspection, contractor progress payments and acceptance) for government projects are inherently governmental in nature. NAVFAC's ROICC functions will never be competed against the commercial sector. This leads us to the question - how does the personnel workload responsibility of NAVFAC's ROICC offices compare to industry organizations with similar construction administration functions?

Specific questions to be addressed in this study include: What is the level of workload responsibility placed on ROICC office construction administration personnel? How does this level of responsibility compare to industry personnel with equivalent positions and/or responsibilities? What organizational characteristics of NAVFAC's general ROICC office model are similar, or dissimilar, to industry construction administration departments? Do these characteristics relate back to level of workload responsibility?

#### 1.1 OBJECTIVES

The overall objective of this study is to compare NAVFAC construction workload responsibility to the selected industry organizations. The overall objective will be accomplished by completing the following.

- Perform a general analysis of annual construction workload responsibility for the ROICC Team during the period of FY 2000 through FY 2002.
- Identify personnel within selected owner organizations with equivalent construction administration positions and/or responsibilities. Collect pertinent staffing and construction workload data.
- Compare NAVFAC workload responsibility to the selected industry organizations.
- Identify organizational factors that influence the organizations' levels of workload responsibility for each position.

#### 1.2 SCOPE

A general analysis of construction workload responsibility will be performed on three NAVFAC ROICC office positions: Project Manager, Contract Specialist, and Quality Assurance Representative. This trio of NAVFAC construction administration personnel will now be referred to as the "ROICC Team". Specific responsibilities will be discussed in Chapter Four.

The period for this study is fiscal year (FY) 2000 through FY 2002. A FY cycle is October 1<sup>st</sup> through September 30<sup>th</sup>. For example, FY 2004 starts on October 1, 2003 and ends on September 30, 2004. The period of study was selected to retrieve current data and assure consistency. External environmental factors including the national economy, politics and global issues were relatively stable during the course of this period.

Industry organizations identified for comparison were selected on the basis of having similar characteristics to NAVFAC. These characteristics include: owner type, substantial volume of annual construction, internal construction administration personnel and data easy to collect.

The industry organizations are identified below with their respective construction administration departments.

- The University of Texas System, Office of Facilities Planning and Construction, Austin, Texas
- Texas A&M University System, Facilities Planning and Construction
   Department, College Station, Texas
- The DuPont Company, Facilities Construction and Support, Wilmington,
   Delaware

#### 1.3 THESIS ORGANIZATION

Chapter Two provides a general background of construction administration and organizational structure. Chapter Three explains the methodology employed for this study. Chapter Four discusses the history, mission, and macro structure of NAVFAC. The organization of a typical ROICC office is examined and the post-award contract responsibilities of the ROICC Team are discussed. Chapters Five through Seven discuss the history, mission, and macro structure of the industry owner organizations. The owners' respective construction administration departments are examined and personnel with equivalent positions and/or responsibilities to the ROICC team are identified. Chapter Eight presents, for all organizations, annual work-in-place construction dollars and staffing data collected during the study period. Chapter Nine presents study assumptions and the analysis of comparing workload responsibility between the ROICC Team and industry equivalents. In closing, Chapter Ten presents conclusions drawn from Chapter Nine. A Glossary is provided to assist the reader with the terminology used in this study.

## **CHAPTER 2: BACKGROUND**

This chapter presents background information of construction administration and organizational structure. Discussion will include the responsibilities of construction administration individuals and the elements and types of organizational structure.

#### 2.1 CONSTRUCTION ADMINISTRATION

Construction projects involve three principal participants: the owner, the designer, and the general contractor. The owner, as the financer and driver of the project, utilizes an in-house staff of engineers or hires an architectural/engineer (A/E) firm to design a project that will meet the owner's business needs.

After the project has been planned and designed to the owner's satisfaction, the process begins to advertise the project and solicit proposals from construction contractors. The proposals are reviewed by the owner's contracting staff and the project is awarded to the contractor with the best value proposal. Depending on the complexity of the project, a general contractor, also known as the prime contractor, will hire subcontractors for specialized areas of construction and/or services. The prime contractor, not the subcontractors, is responsible for completing the project as outlined in the contract and in accordance with the project specifications. Construction contracts involve working relationships

among numerous individuals. Various levels of construction administration are required from all primary participants to ensure a successful project.

Fisk (2000) defines *construction administration* as the broad responsibility of relating to all project-related functions between the parties of a contract. The functions include, but are not limited to, relations with contractors, communications, procedures, responsibility, authority, planning and scheduling, construction operations, coordination, payment administration, change orders, negotiations, dispute and claim handling, and project closeout.

Fisk (2000) identifies four individuals associated with construction administration with unique roles and responsibilities. The individuals below are defined from the owner's perspective.

Project Manager – A project manager (PM) is responsible for all phases of the project. The PM is involved in the infancy stages of pre-project planning, through the entire design process, awarding of the contract and contract close out. The PM may be involved in the selection of the A/E firm for design and will supervise staff or initiate a separate contract for construction administration.

Construction Manager – The services of a construction manager (CM) will overlap in the design and construction phases of a project. Tasks include bidding strategy input, design phase review, cost and schedule management, proposal evaluation, contractor selection, and on-site construction phase management. On-site construction phase management includes phasing,

coordinating, determining conformance of materials and quality of work to the project specifications, preparation of contract modifications, and contractor progress payments.

Quality Control Representative — A quality control representative is a member of the contractor's organization and is responsible for the quality control (QC) plan. A QC plan is an inspection system implemented by the contractor to assure the work of the prime contractor and subcontractors meets project specifications. Documentation of QC inspections and training is provided to the owner's quality assurance representative. The frequency and level of detail associated with the contractor's documentation is specified in the QC plan.

Quality Assurance Representative — The quality assurance (QA) representative spends most of his/her time in the field observing the contractor's work and notifies the CM of any variations from the plans and specifications. QA representatives do not have contractual authority to direct the contractor to perform work outside of the plans and specifications. However, the QA representative should be able to evaluate and solve any problems encountered in the field and make recommendations to the CM.

The organization of a construction administration team affects internal and external relationships of and how well a team can efficiently manage numerous projects without delays. The roles and responsibilities of four construction administration individuals were discussed in this section. In the forthcoming

section, the author discusses the factors that influence organizational structure and the pattern of construction management.

#### 2.2 ORGANIZATIONAL STRUCTURE

An organization's structure, effectiveness, and development is influenced by many factors. The environment surrounding an organization and its projects, including social, economical, political, and technological factors, has a major impact on organizations. The behavior of the environment affects the actions of an organization. Social factors include income, work attitudes, and lifestyle changes. Economic factors include inflation, energy issues, and disposable income.

As Naoum (2002) explains, "In order for an organization to survive, it requires a business strategy to link its operational and administrative activities with the external environment" (p. 42). Corporate strategy is essential for any organization. Strategy identifies the organization's mission and sheds light on the organization's weaknesses and strengths. Strategy lays the road map ahead to create business opportunities or plan for significant changes due to the external environment or internal attitudes. Organizations develop a strategy to increase efficiency, overcome an obstacle, plan for the future, develop, and create a positive and motivating work environment.

Figure 2.1 presents the pattern of management and the factors that affect an organization's structure.

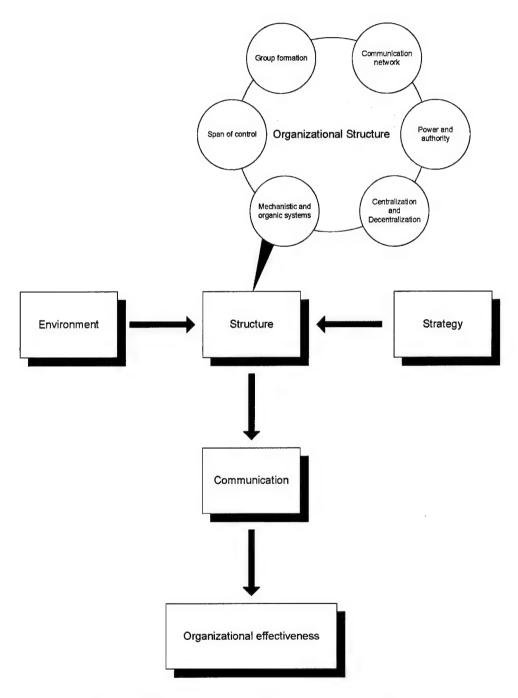


Figure 2.1. Organizational Structure (Naoum, 2001)

Organizational structure is defined as achieving an objective by assembling individuals, defining tasks, and establishing the chain of command (or reporting lines). Naoum associates five elements to organizational structure: group formation, communication network, power and authority, centralization and decentralization, leadership styles, and span of control.

Group formation – The formation of departments by individual skills and work experience, work functions and processes, and by clients. Group formation objectives include distribution of work, management of work, information processing, coordination, and conflict resolution.

Communication network – Information must be efficiently obtained, transferred, and shared by various departments to achieve objectives. Communication networks vary with the structure of the organization. An organization with set tasks and processes is most likely to have an efficient communication network. In contrast, an organization operating in a complex and uncertain environment will constantly change its communication network in order to adapt to the current challenges.

Power and authority – As with communication networks, power processes vary between organizations. Power processes include the authority, allocation, and delegation of power.

Centralization and decentralization - Centralized authority is typically located at the top of an organization's hierarchy. Centralized authority is suitable

for specialized organizations, easy to coordinate and control, and decision making is fast but distant from operational level. In a decentralized organization, the power is disseminated through different departments. Decentralized authority is suitable for standardized organizations, more complex with respect to coordination and control, and slow at decision making but closer to the operational level.

Leadership styles – Leadership styles can be divided into two areas: mechanistic and organic. Traits of mechanistic leadership include emphasis on functional specialization, defined position descriptions with rights and obligations, hierarchic structure and control, tendency for interaction between superiors and subordinates, and operations are governed by the supervisors' instructions and decisions. The characteristics of an organic leadership include contribution of special knowledge, nature of individual tasks, network of control, authority, and communication, lateral direction of communication, and informative communication rather than instructive.

Span of control – Span of control is defined as the number of relationships and subordinates under a supervisor. There are two types of span of control: narrow and wide. In a narrow span of control, the reporting lines are long with small groups. Wide span of control consist of smaller reporting lines and larger groups.

Naoum (2001) classifies organizational structures into three types. They types are listed and described below.

The simple structure – A business in its early stages of development is an example of a simple structure. The owner handles most of the management responsibilities. The characteristics of a simple structure include centralized power, a wide span of control, informal communication, direct supervision, single decision making, and fast reaction to a dynamic environment.

The functional structure – In a functional structure, supervisors have authority over subordinates in their departments or divisions only. A functional structure is characterized by decentralization of functional power, a narrow span of control, direct and indirect supervision, formal communication, having a business strategy, and a slow reaction to a dynamic environment.

The matrix structure – This structure is common for large organizations with complex projects and require horizontal hierarchy (in addition to vertical hierarchy) to improve coordination and functions between departments. The matrix structure can be applied at the organizational level and the project level. The characteristics of a matrix structure include functional power, shared expertise, a narrow span of control, direct supervision and operational control, integrated group decision making, having a responsive strategy, and fast response to a dynamic environment.

#### 2.3 SUMMARY

In this chapter, construction administration was defined as the broad responsibility relating to all project-related functions between the parties of a construction contract. The roles and responsibilities of specific construction administration individuals were discussed. Organizational structure was defined as achieving an objective by assembling individuals, defining tasks, establishing the chain of command, and was influenced by the environment and business strategy. Organization structure consists of five elements and can be classified into three types. The forthcoming chapter discusses the methodology employed to accomplish this study.

## **CHAPTER 3: STUDY METHODOLOGY**

In order to achieve a successful apples to apples comparison of construction workload responsibility, a methodology was employed to (1) collect staffing and construction workload data from NAVFAC (2) research and become familiar with the staff and contract process of the construction administration departments within the industry organizations and (3) collect pertinent data from the industry organization for analysis and comparison.

#### 3.1 NAVFAC DATA

The author first contacted NAVFAC Headquarters to acquire staffing and annual construction workload data from all ROICC offices. NAVFAC has a total of 90 ROICC offices in the continental U.S. and overseas. ROICC office locations are provided in Appendix A. ROICC offices report staffing and workload numbers biannually to NAVFAC via the NAVFAC Field Office Readiness (NFOR) reports. The NFOR report is NAVFAC's tool for assessing ROICC office readiness. In addition to staffing and annual workload, all ROICC offices report total personnel qualifications, logistics and information technology. A staffing number is computed for each ROICC office using a staffing algorithm. The algorithm plays a significant role in the budgeting and staffing of each ROICC office.

Workload numbers are reported in the NFOR report as Type I construction work-in-place (WIP), Type II construction WIP, and Facility Service Contracts WIP. The NAVFAC Contracting Manual, P-68, defines WIP as the value of construction, repair, and maintenance work put in place, during a specific period, including paid materials on site and certified land acquisition (U. S. Naval Facilities Engineering Command). NAVFAC defines *Type I* construction as construction involving sophisticated engineering and design, or requires plans and specifications. *Type II* construction is defined as construction requiring limited technical design, and can be executed by delivery order/task order contracts or can be executed by a Public Works Center (PWC) or Public Works Department (PWD) in-house forces.

NAVFAC accumulates NFOR data submitted by all ROICC offices on Microsoft Excel spreadsheets and organizes the spreadsheets by reporting periods. The spreadsheets contain the following information (items in *italics* were extracted from the spreadsheets and utilized for this study).

- Engineering Field Division/Activity name
- Field Office name
- Area construction factor
- Annual Type I construction WIP
- Annual Type II construction WIP
- Annual Facilities Service Contracts WIP

- Staffing numbers for Civil Engineer Corps officers, contract specialists,
   project managers, and quality assurance representatives
- Staffing algorithm numbers for all positions

Prior to November 2000, NFOR reports were submitted on a quarterly basis. ROICC offices currently submit NFOR reports on a biannual basis. Refer to Appendix A for NFOR data from FY 2000 through FY 2002. The period of study, FY 2000 through FY 2002, was selected to retrieve current data and assure consistency.

For each reporting period, ROICC offices report the latest status of annual construction WIP dollars. Therefore, annual WIP dollars from early FY reports are the offices' best estimate. The most accurate numbers are provided during the last reporting period of the FY. To account for the differences in construction WIP dollars reported and staffing fluctuations, the mean annual construction WIP and the mean quantity of personnel was used for analysis.

The spreadsheets reviewed included the following reporting periods.

- FY 2000 March 2000, June 2000, and September 2000
- FY 2001 November 2000, January 2001, and July 2001
- FY 2002 January 2001 and July 2001

61 of NAVFAC's 90 ROICC offices are located within the continental U.S. (CONUS). Therefore, data has been categorized into two groups: "NAVFAC" and "NAVFAC CONUS". The "NAVFAC" group includes data from all 90

ROICC offices whereas the "NAVFAC CONUS" group only consists of data from CONUS ROICC offices. ROICC offices located outside the continental U.S. are referred to as OCONUS ROICC offices. The purpose for dividing NAVFAC data into two groups is to assure the data from OCONUS ROICC offices was consistent with CONUS ROICC offices.

### 3.2 STUDY QUESTIONNAIRE

The author developed a questionnaire and used it as an interview guide to acquire the following data from the industry organizations.

- Macro organization chart
- Construction administration organization chart
- Position descriptions and qualifications for all construction administration personnel
- Description of construction contract processes
- Annual construction WIP dollars or equivalent
- Annual staffing numbers for all construction administration personnel

The questionnaire is located in Appendix B. A courtesy copy of the questionnaire was forwarded to senior facility representatives within each industry organization prior to personal or phone interviews. The facility representatives are identified below.

• Assistant Vice Chancellor of Facilities and Construction, Office of

Facilities Planning and Construction, The University of Texas System

- Executive Director, Facilities Planning and Construction Department,
   Texas A&M University System
- Engineering Director, DuPont Engineering, The DuPont Company
   Personal interviews were then conducted with the aforementioned representatives
   from The University of Texas System and Texas A&M University System.
   Several phone interviews were conducted with a DuPont engineer from the
   Facilities Construction and Support Department.

#### 3.3 CONSTRUCTION WORKLOAD RESPONSIBILITY

An objective of this thesis is to analyze and compare construction workload responsibility between NAVFAC and the selected industry organizations. The individuals that make up the ROICC Team have unique post-contract award construction administration duties; therefore, an individual analysis of workload responsibility can be accomplished for each position.

For the purposes of this study, construction workload responsibility is defined as:

Annual Construction Work-in-Place (\$) / Quantity of Personnel

NAVFAC defines WIP as the value of construction work put in place during a specific period. The metric above is simple and straightforward and provides us

with average annual responsibility for any construction administration position in question. Additionally, the use of this metric allows us the author to disregard staffing allocation (i.e. the quantity and mix of personnel assigned to manage a single construction project).

#### 3.4 SUMMARY

NAVFAC construction workload and staffing data was extracted from NFOR (NAVFAC Field Office Readiness Reports) spreadsheets covering various reporting periods during FY 2000 through FY 2002. Interviews were conducted with the selected industry organizations to acquire (1) specific information regarding the operations and responsibilities of construction administration personnel and (2) collect pertinent staffing and WIP data during the study period. The metric to be utilized for comparison, construction workload responsibility, was defined and justified.

The next three chapters will discuss the history, mission, and macro structure of each organization and examine the organizations' respective construction administration departments.

## CHAPTER 4: U.S. NAVAL FACILITIES ENGINEERING COMMAND

This chapter provides an overview of the U.S. Navy Facilities Engineering Command (NAVFAC) and discusses the role of the Resident Officer in Charge of Construction (ROICC) office with emphasis on the responsibilities of the ROICC Team: Project Manager, Contract Specialist and Quality Assurance Representative.

#### 4.1 HISTORY AND MISSION

NAVFAC's beginnings are traced to 1842 when it was then known as the Navy Bureau of Yards and Docks. At that time, the Bureau was composed of only civilian engineers and was responsible for seven ship yards, four ordnance magazines, and five naval stations. On March 2, 1867, Congress passed a bill wherein the President appointed all Navy civil engineers. As a result, civil engineers were listed in a publication of commissioned and warrant officers and were included in the annual pay. Thus, March 2, 1867 is celebrated as the birth of the Navy Civil Engineer Corps (CEC).

By the 1900's, the Bureau had 40 officers and the first CEC officer had been appointed as the Chief of the Bureau of Yards and Docks - preceding Bureau chiefs were line officers. The Spanish-American war highlighted the need for CEC officers as the treaty at war's end established naval stations in Puerto Rico,

Guam, Philippines and Cuba. Existing yards were modernized and new yards were being built at an enormous pace.

During World War I, the Bureau consisted of more than 200 CEC officers responsible for over \$300 million for the construction of training camps, submarine bases, and naval air stations throughout the U.S. and abroad. The period after the war saw a decline in CEC officers to fewer than 150. The start of World War II found the Navy's shore establishments unprepared for technological advances. Again, the need for CEC officers was great and the Bureau managed over \$9 billion in construction of facilities, hospitals, air bases and repair facilities during 1940 to 1945. By 1945, the Bureau was over 12,000 CEC officers strong. It was also during World War II that the Naval Construction Battalions were founded to perform construction in combat areas. Commanded by CEC officers, the men of the Naval Construction Battalions, also known as Seabees, were experienced construction workers trained with weapons for self defense. The Seabee motto, "We build, we fight" was born and the Seabees played a significant role in the Allied victory.

Following World War II, the CEC and Seabees saw action in Korea during the 1950's and in Vietnam from the mid 1960's to the early 70's. The demand for Seabees in Vietnam was great and the number of battalions increased from ten to twenty-one. There are currently ten active battalions – eight mobile construction battalions and two amphibious construction battalions.

"NAVFAC is the U.S. Navy's facilities, installation, and contingency engineers" (U. S. Naval Facilities Engineering Command). The U.S. Marine Corps, the Department of Defense and other federal agencies are also NAVFAC clients.

NAVFAC is responsible for the planning, design, and construction of shore facilities - a key player in assuring the readiness of the U.S. Navy and Marine Corps combat forces worldwide. NAVFAC's specialized operations include: (1) Naval Construction Force – Seabee battalions capable of immediate deployment anywhere in the world to support contingency engineering operations (2) Naval Facilities Engineering Service Center - specialized engineering and products and (3) the Navy Crane Center - responsible for the engineering, procurement and evaluation of the Navy's shore based crane program.

#### **4.2 ORGANIZATION**

NAVFAC is headquartered in Washington D.C. Responsibility is established by geographic areas and is divided among four Engineering Field Divisions (EFD).

- Atlantic Division, Norfolk, VA
- Pacific Division, Pearl Harbor, HI
- Southern Division, Charleston, SC
- Southwest Division, San Diego, CA

An EFD's responsibility is focused on facility acquisition: contract award, issue contract warrants, and provide field guidance and environmental regulation.

An EFD may have a smaller subordinate activity called an Engineering Field Activity (EFA). EFA's have similar functions as EFD's but are smaller in size. There are currently seven EFA's within NAVFAC.

- EFA Chesapeake, Washington D.C.
- EFA Mediterranean, Naples, Italy
- EFA Midwest, Great Lakes, IL
- EFA Northeast, Lester, PA
- EFA Northwest, Poulsbo, WA
- EFA Southeast, Jacksonville, FL
- EFA West, Daly City, CA

Another EFD subordinate is the Officer in Charge of Construction (OICC). In comparison to ROICC offices, OICC's support a geographical area whereas a ROICC office will support activities on a naval base. NAVFAC contains three OICC's.

- OICC Far East, Yokosuka, Japan
- OICC Marianas, Guam
- OICC Naples, Italy

The ROICC offices are a subordinate organizational element of a respective EFD/A at the naval activity/base level. In addition to construction, the ROICC offices execute and administer facilities service and A/E design contracts.

For geographical areas with a large concentration of naval activities, the purview of facilities management and maintenance falls under a Public Works Center (PWC). In comparison to PWC's, a naval base may have a smaller Public Works Department (PWD) headed by a CEC officer, also known as a Public Works Officer (PWO). A PWO directly reports to the base commanding officer whereas the commanding officer of a PWC reports to a regional commander. There are nine PWC's including six in the continental U.S., a PWC in Hawaii, a PWC in Guam, and a PWC in Japan.

A NAVFAC organizational chart is presented in Figure 4.1.

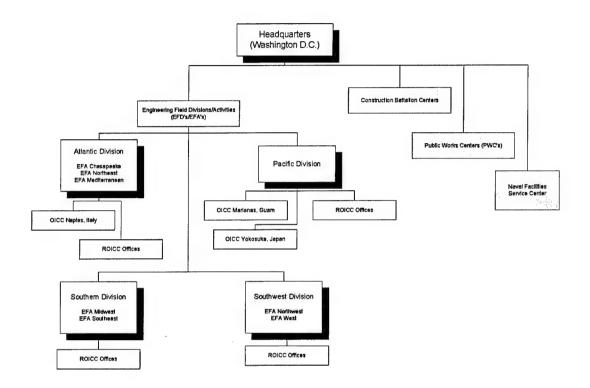


Figure 4.1. NAVFAC Organization

The forthcoming section will discuss the organization and operations of the ROICC office the responsibilities of the Project Manger, Contract Specialist, and Quality Assurance Representative.

## 4.3 ROICC OFFICE

As previously discussed, the mission of the ROICC office is to execute and administer construction, facilities service and A/E design contracts. The categories of NAVFAC construction contracts are vast: projects range from bachelor quarters to ship piers to ship repair facilities to commercial buildings to

residential housing to aviation hangars. Most construction projects are awarded at the EFD/A level and the ROICC office is responsible for the field construction administration. Construction contract types include design build, firm fixed price, cost reimbursement, and negotiated contracts.

Each ROICC office is unique in some form or another. No two offices handle the day to day construction administration functions in the same manner. Therefore, the ROICC office organization presented here is general and is typical for most offices. The common thread is the responsibilities and duties of the ROICC Team.

The title, ROICC, refers to a CEC officer typically with a U.S. Naval rank of Lieutenant Commander or Commander. The ROICC is responsible for the overall management of the office and the administration of assigned contracts. An EFD/A will delegate contracting authority to the ROICC. As a contracting officer (KO), the ROICC has the authority to enter, modify or terminate a contract in compliance with the Federal Acquisition Regulation and other applicable federal laws.

The ROICC is supported by a construction administration team of CEC officers and civilians. The team consists of:

Resident Engineer in Charge of Construction (REICC) – a civilian engineer designated by the ROICC for technical support and oversight of projects.

Assistant Resident Officer in Charge of Construction (AROICC) – a CEC officer (junior in rank to the ROICC) designated by the ROICC to administer construction contracts.

Project Manager – also known as the Assistant Resident Engineer in Charge of Construction (AREICC), a civilian engineer designated by the ROICC to administer construction contracts.

Contract Specialist – responsible for contract administration that involves executing contractual actions.

Quality Assurance Representative – responsible for quality assurance and surveillance of the contractor's work and quality control plan.

Office Assistants – assist with the contracting paperwork.

A typical ROICC office organization is presented in Figure 4.2.

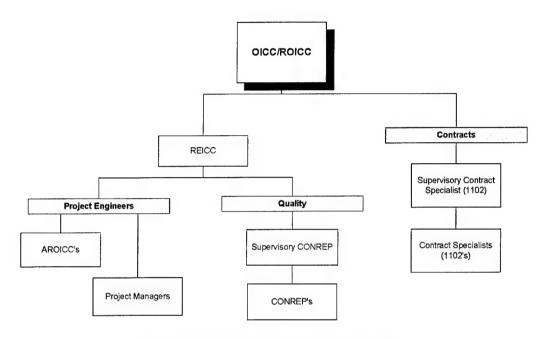


Figure 4.2. ROICC Office Organization

It's important to note that ROICC civilian employees are on a pay scale known as the General Schedule (GS). The levels, or grades, vary from GS-1 up to the highest grade of GS-15. Additionally, each GS grade has ten pay steps based on time in service and work performance. The duties and responsibilities of, for example, a GS-11 Project Manager are more demanding than a GS-09 Project Manager. Also, a GS-11 Project Manager would require little or no supervision where a GS-09 may be supervised periodically. Similarly, the level of responsibility given to CEC officers is primarily based on rank.

The issue of civilian seniority and military rank for ROICC Team positions is important to remember when comparing workload responsibility to industry personnel with equivalent positions and/or responsibilities. This issue

will be addressed in Chapter Nine. The next three sections will provide a general overview of construction contracting and explain the duties of the Project Manager, Contract Specialist, and Quality Assurance Representative.

### 4.3.1 Construction Contracting

Funds for construction projects are categorized into four areas: (1) Navy and Marine Corps Operation and Maintenance (O&M) (2) Other than Navy and Marine Corps O&M (3) Nonappropriated and (4) Department of Defense Military Construction, also known as MILCON.

NAVFAC's contracting methods include sealed bidding, negotiation, and simplified acquisition procedures (contracts less than \$100,000). The Federal Acquisition Regulation, or FAR, is a document that provides guidance on construction acquisition policies and procedures. Common construction contracts include the following types.

Firm Fixed Price – a contract used when the quantity, quality, and delivery time of a project is known.

Design-Build – a single contractor has complete responsibility for both design and construction.

Solution Order Concept (SOC) - a multiple award, indefinite quantity contract for design build services. Contractors have been selected to the SOC program after competing on a "seed" project.

Job Order Contract (JOC) - a firm fixed-price, indefinite quantity contract which contains a database of priced line items for construction work. The line items provide a basis for the negotiation of firm fixed-price work orders.

Multi-Trade Contract - similar to a JOC contract, this is a firm fixed-price, indefinite quantity contract which contains priced labor rates and established material costs.

### 4.3.2 Project Manager

The Project Manager and AROICC have identical construction administration functions. The only difference between the two is a matter of title; a Project Manager is a civilian on the GS pay scale whereas the AROICC is a CEC officer.

The Project Manager has limited pre-award duties. He/she may be asked to perform a review of a partial or complete design package before a contracting strategy is selected.

Responsibilities of the Project Manager/AROICC are listed below per NAVFAC position descriptions:

- Knowledgeable of the project scope of work by reviewing plans and specifications of assigned projects
- Assure timely completion of projects in accordance with plans and specifications
- Interprets and clarifies intent and purpose of plans and specifications
- Investigates proposed field conditions requiring change from plans and

specifications

- Determines degree of tolerance to be granted to contractors within plans and specifications
- Approves workmanship and installations
- Investigates and approves contractor requested delays
- Works with, coordinates, and maintains public relations between representatives of the Government, contractor, and A/E
- Conducts preliminary and final joint inspections

# 4.3.3 Contract Specialist

The purpose of a Contract Specialist is to perform pre-award and post-award contracting services.

Responsibilities of the Contract Specialist are listed below per NAVFAC position descriptions:

- Coordinates acquisition planning
- Coordinates specification requirements development and issues solicitations
- Evaluates responses to solicitations
- Negotiates prices, terms and conditions
- Prepares price negotiation memoranda
- Processes both pre and post award protests
- Prepares award documentation
- Serves as a KO (Contracting Officer)

# 4.3.4 Quality Assurance Representative

The Quality Assurance Representative, also known as the CONREP (for Construction Representative), is responsible for quality assurance and surveillance of the contractor's work and quality control plan.

Responsibilities of the Quality Assurance Representative are listed below per NAVFAC position descriptions:

- Is cognizant of the contract plans and specifications
- Studies and monitors the contractor's Quality Control Plan
- Maintains surveillance over work of contractors to assure work is in accordance with the contract plans and specifications and the contractor's Quality Control Plan
- Renders advice and support to the Project Manager on problems encountered
- Determines degree of tolerance granted to contractors within the intent of contract plans and specifications
- Investigates and provides recommendations to the Project Manager for delays requested by contractors
- Enforces compliance with safety regulations specified in the contract plans and specifications
- Conducts preliminary and final joint inspections of construction work

# 4.3.5 Qualifications

Table 4.1 presents NAVFAC's required qualifications for the Project Manager/AROICC, Contract Specialist and Quality Assurance Representative. Civilian grades noted represent a mid-level position within the GS pay scale.

Table 4.1. Qualifications for NAVFAC ROICC Team

Description	Position				
	Project Manager (Grade GS- 9)/AROICC	Contract Specialist (Grade GS-9)	Quality Assurance Representative (Grade GS-4)		
Education	BS degree in Professional Engineering or combination of education and experience	Bachelor's degree w/ a major in any field or at least 24 semester hours in any combination of specific fields	High school diploma or equivalent and 2 years of courses above high school related to the occupation		
Experience	>1 year of appropriate professional experience (civilian only)	1 year equivalent experience as GS-5 and 1 year as GS-7	>6 months experience as CONREP		
Licenses, Certificates or Registrations	None	None	None		

## 4.4 SUMMARY

NAVFAC is responsible for the planning, design, and construction of shore facilities for the U.S. Navy and Marine Corps Team. The ROICC office is NAVFAC's field office responsible for administering construction contracts. The ROICC is a CEC officer responsible for the overall management of the office and the administration of assigned contracts. He/she is supported by a construction administration team of CEC officers and civilians. ROICC Team member responsibilities were discussed and will serve as the basis for finding industry personnel with equivalent positions and/or similar responsibilities.

### **CHAPTER 5: THE UNIVERSITY OF TEXAS SYSTEM**

This chapter provides an overview of the University of Texas System, discusses the role and organization of the Office of Facilities Planning and Construction (OFPC), and identifies OFPC staff with equivalent positions and/or responsibilities to NAVFAC's ROICC Team.

#### 5.1 HISTORY AND MISSION

The University of Texas was founded in Austin, Texas in late 1883. The University originated from the Congress of the Republic of Texas via an act in 1839 to locate and set aside a site for a university. Subsequent acts allocated over 231,000 acres of land and \$100,000 in United States bonds for the establishment of two universities. As a result of Texas' secession and the Civil War, funds were diverted to the needs of the state and weren't repaid until 1883.

The first year faculty composed of eight professors and enrollment was 221 students. The University occupied 40 acres near the state capitol. After the first year of World War I, enrollment increased to over 4,000 students and continued to increase to over 15,000 students after World War II. By the 1970's, the University enrolled over 30,000 students and consisted of 1,800 faculty members with eight colleges and four schools on the main university and four campus branches. The Sixtieth Texas Legislature officially changed the name of the main university to The University of Texas at Austin in 1967. By 1984, the

University had eight colleges and seven schools which offered more than 100 undergraduate degree programs and 170 graduate degree programs.

The U.T. System currently has nine universities in the following Texas cities: Arlington, Austin (main campus), Brownsville, Dallas, El Paso, McAllen, Odessa, San Antonio, and Tyler. The System also includes six health institutions with four medical, two dental and nine nursing schools. Assets in buildings and lands total over \$22 billion. For the entire University System in the fall of 2002, there were more than 169,000 students and 87,000 faculty and staff (The University of Texas at Austin).

### **5.2 ORGANIZATION**

The University of Texas (U.T.) System administration is based in Austin, Texas. Rules and regulations are established by the Board of Regents, a nine member committee appointed by the Texas Governor and approved by the Texas Senate. The Chancellor, the Chief Executive Officer of the U.T. System, reports to the Board of Regents and is ultimately responsible for all U.T. System operations.

The Chancellor is supported by Administrative Officers each responsible for a specific area. The areas include:

- Health Affairs
- Business Affairs

- Academic Affairs
- Administration
- General Counsel
- Governmental Relations
- Development and External Relations
- Federal Relations
- Educational System Alignment
- Community Relations
- Investment Management Company

The delivery of capital construction and renovation projects fall under the responsibility of the Office of Facilities Planning and Construction (OFPC).

OFPC is headed by the Assistant Vice Chancellor for Facilities Planning and Construction who reports to the Chancellor through the Executive Vice Chancellor of Business Affairs.

Figure 5.1 presents an organization chart of the U.T. System.

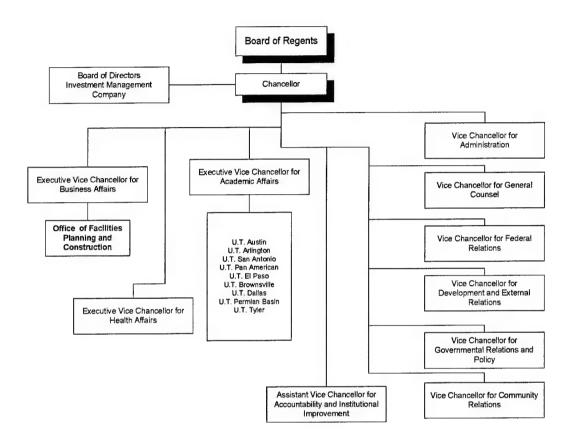


Figure 5.1. U.T. System Organization

### 5.3 OFFICE OF FINANCIAL PLANNING AND CONSTRUCTION

The Office of Financial Planning and Construction (OFPC) is responsible for the delivery of capital construction projects for the U.T. System. The Capital Improvement Program (CIP) is System's six-year projection of major repair/rehabilitation and new construction projects. Major repair/rehabilitation projects are defined as projects with costs exceeding \$2 million. Major new

construction projects are defined as projects with costs exceeding \$1 million. CIP project funds are approved and appropriated by the Board of Regents.

## **5.3.1 CIP Process**

The process for a CIP project begins with the need for major repair or construction from an institution within the U.T. System. OFPC provides the institution with a Project Planning Form to describe, justify, and identify funding The planning form is then forwarded to the Offices of Academic sources. Affairs and Health Affairs where it is further evaluated and reviewed. refinements are made to the plan, OFPC will return the plan to the institution for final review and approval. The plan is then forwarded to the Executive Vice Chancellor of Business Affairs and the Chancellor and is proposed to the Board of Regents. For every project approved by the Board of Regents and adopted in the CIP, three percent of the anticipated total project cost is allowed for programming and design development. New construction projects that are architecturally significant are later presented to the Board of Regents for design approval and the request for appropriation of funds. New construction projects financed with tuition bonds are further reviewed and approved by the Texas Higher Education Coordinating Board. The OFPC staff continues to manage the project through completion, turnover and warranty work. The CIP program for 2002 through 2007 is valued at over \$3.7 billion (The University of Texas at Austin).

## 5.3.2 Organization

The Assistant Vice Chancellor for Facilities Planning and Construction is responsible for the management and operations of OFPC. There are three divisions below the Assistant Vice Chancellor: Project Management Division, Administration Division, and Engineering Division. The Project Management Division is divided into five regions and is responsible for construction administration. The regions include Austin, Houston, North/West Texas, Galveston/Tyler, and South Texas. Figure 5.2 presents the organization of OFPC.

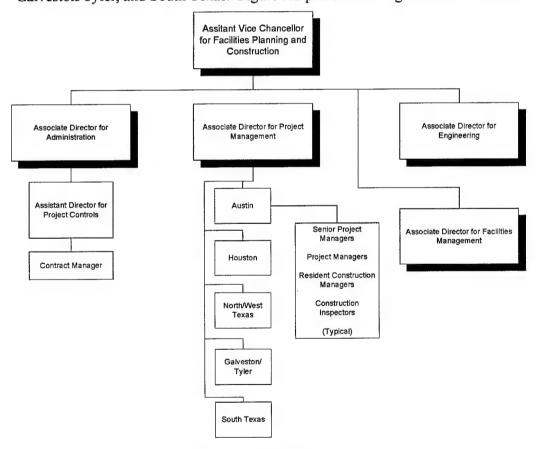


Figure 5.2. OFPC Organization

Each region within the Project Management Division contains the following construction administration personnel. The responsibilities of each individual are described per OFPC's General Project Delivery Process Guidelines & Reference Manual.

Senior Project Manager – provides guidance and management of CIP projects to U.T. System institutions. Supports pre-project planning activities and design processes as managed by the Project Manager. Provides support to the Resident Construction Manager and Construction Inspector.

Project Manager – supports the Senior Project Manager with project coordination, pre-project planning activities, supervise contract administration activities and provides support to the Resident Construction Manager and Construction Inspector during construction activities. For competitive sealed proposal projects, the Project Manager handles all management during the design phase and turns over management to the Resident Construction Manager after the notice to proceed.

Resident Construction Manager – responsible for field construction administration: monitor construction schedule, project costs, and manage the change order process. Has the authority to authorize changes to contracts up to \$100,000 for any event or accumulation of events. The Project Manager, when acting in the capacity of the Resident Construction Manager, has the same contracting authority for contract changes.

Construction Inspector — inspect contractor work for compliance with project plans and specifications, review and approve monthly contractor invoices, review project submittals, coordinate material testing and support in change order negotiations. Has the authority to authorize changes to contracts up to \$5,000 per event.

Contract Manager – responsible for contract advertising, contractor selection process; monthly status reports; approves contractor certificates for payment; maintains current and historical records of contract and cost data for all projects; and coordinates insurance certificate requirements with contractors and insurance providers, construction agreements, bonds, and insurance prior to final execution. The contract manager is a member of the Administration Division and is the only individual within OFPC ultimately responsible for post-award construction contract actions.

### **5.4 ROICC TEAM EQUIVALENTS**

The organization of OFPC's Project Management Division regions is analogous to the organization of NAVFAC's ROICC offices. ROICC Team equivalents were identified after discussions with the OFPC Assistant Vice Chancellor and review of OFPC's process guidelines.

• The Resident Construction Manager is the equivalent field representative to NAVFAC's Project Manager. Both individuals have

- the similar responsibilities within their respective organizations with only minor differences.
- The Contract Manager and Project Manager are the equivalent field representatives to NAVFAC's Contact Specialist. Per the Assistant Vice Chancellor, approximately ten percent of the Project Manager's time is devoted to pre-award construction duties equivalent to the duties of NAVFAC's Contract Specialist.
- The Construction Inspector is the equivalent field representative to NAVFAC's Quality Assurance Representative.

## 5.4.1 Qualifications

Table 5.1 presents U.T. System's required qualifications for the Resident Construction Manager, Contract Manager and Construction Inspector.

Table 5.1. U.T. System Qualifications for NAVFAC Equivalents

Description	Position				
	Resident Construction Manager	Contract Manager (Project Controls Group)	Project Manager	Construction Inspector	
Education	BS degree in Architecture or Engineering	BS degree in Architecture or Engineering	BS degree in Architecture or Engineering	High school diploma or GED equivalent	
Experience	>3 years experience in construction contract administration	>5 years project management experience	>3 years project management experience	>5 years experience in maintenance and construction	
Licenses, Certificates or Registrations	None	None	Registration as Professional Engineer/Architect Required	None	

### **5.5 SUMMARY**

The University of Texas System is headquartered in Austin, Texas and is composed of nine universities and six health institutions. Total building and land assets of the U.T. System total over \$22 billion. The Office of Facilities Planning and Construction is responsible for the delivery of capital construction projects for the U.T. System. OFPC reports to the Chancellor via the Executive Vice Chancellor of Business Affairs.

The Capital Improvement Program is the System's six-year projection of major repair/rehabilitation and new construction projects. Major repair/rehabilitation projects and construction projects are defined as projects with costs exceeding \$2 million and \$1 million, respectively.

OFPC's Resident Construction Manager and Construction Inspector were identified as the equivalents to NAVFAC's Project Manager and Quality Assurance Representative, respectively. OFPC's Contract Manager, Senior Project Manager, Project Manager, Resident Construction Manager and Construction Inspector collectively shared the pre and post-award responsibilities of NAVFAC's Contract Specialist.

# **CHAPTER 6: TEXAS A&M UNIVERSITY SYSTEM**

This chapter provides an overview of the Texas A&M University System, discusses the role and organization of the Facilities Planning & Construction (FP&C) Department and identifies FP&C staff with equivalent positions and/or responsibilities to NAVFAC's ROICC Team.

#### **6.1 HISTORY AND MISSION**

Texas A&M University was established in 1876 as the Agricultural and Mechanical College of Texas and was the state's first public institution of higher education. In addition to the more than 231,000 acres allocated under an act of the Congress of the Republic of Texas in 1839, the 1862 Morrill Act donated an additional one million acres of state land for the development of one or more state universities. The Morrill Act stated "... the leading object shall be... to teach such branches of learning as are related to agriculture and the mechanic arts" (The Texas State Historical Association, p. 1). Since no public land was available for donation in Texas, the act allowed for Texas to receive and sell 180,000 acres of land in Colorado. Sales of the land totaled \$156,000 and the state legislature approved a bill for the appropriation of \$75,000 towards the establishment of the Texas Agricultural and Mechanical College in 1871. A site was located near Bryan, Texas where the local citizens donated an additional 2,000 acres of land.

The all-male military college opened in October 1876 with six faculty members and 106 students. Participation in the Corps of Cadets was mandatory. The University of Texas opened in Austin in 1893 and the two schools battled for minimal state funding. However, by 1910, the institution expanded its curriculum to eight degree programs due to the influence of a former governor residing as the school's president.

During World War I, the institution saw half of its graduates in military service with more than 1,200 commissioned officers. A graduate school was structured in 1924 and a doctorate program was established in 1936. Oil was discovered on school grounds in 1931 and the College negotiated to receive a third of the revenues. The revenues allowed for growth and increased enrollment during the difficult years of the Great Depression. During World War II, some 20,000 former students served in the war.

A bill was approved by the Texas Legislature in 1963 changing the name from the Agricultural and Mechanical College of Texas to Texas A&M University. "A&M" would signify the University's history and no longer represent "agricultural and mechanical". In that same year, women were officially admitted to the University. Student enrollment continued to increase and in 2000, Texas A&M University was the fourth largest university in the nation.

The Texas A&M University (TAMU) System consists of nine universities in the following Texas cities and towns: College Station, Galveston, Prairie View, Stephenville, Killeen, Commerce, Canyon, Kingsville, San Antonio, Corpus Christi, Laredo, and Texarkana. The TAMU System also includes eight state agencies and a health science center. The main campus in College Station is home to College of Veterinary Medicine, the University Health Science Center College of Medicine, and the George Bush Presidential Library.

### **6.2 ORGANIZATION**

The TAMU System administration is based in College Station, Texas. Rules and regulations are established by the Board of Regents. The Chancellor, the Chief Executive Officer of TAMU System, reports to the Board of Regents and is ultimately responsible for all TAMU System operations.

The Chancellor is supported by the Deputy Chancellor and Administrative Officers in the following operational areas:

- Administration
- Academic and Student Affairs
- Agriculture
- Engineering
- Health Affairs
- Campus Branches Presidents

- Business Services
- Research and Federal Relations
- Facilities Planning and Construction

The Facilities Planning and Construction Department is responsible for the delivery of capital construction and renovation projects. The FP&C Executive Director reports to the Chancellor via the Deputy Chancellor.

An organization chart of the TAMU System is presented in Figure 6.1.

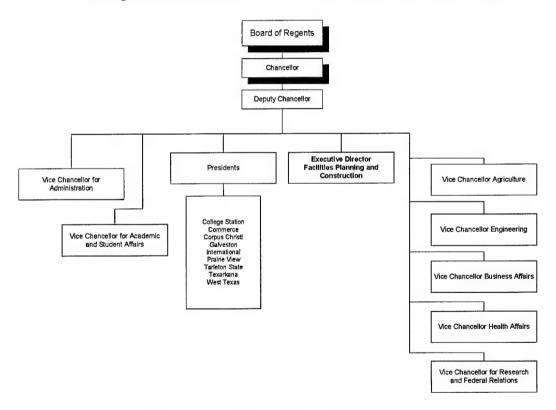


Figure 6.1. TAMU System Organization

### 6.3 FACILITIES PLANNING & CONSTRUCTION DEPARTMENT

The Facilities Planning and Construction (FP&C) Department is responsible for the delivery of capital construction projects for the TAMU System. Major renovation projects are defined as projects with costs exceeding \$2 million. Major new construction projects are defined as projects with costs exceeding \$1 million.

## 6.3.1 Capital Project Program

An institution within the TAMU System will develop a Program of Requirements (POR) starting the process for a capital project. With assistance from FP&C staff, a POR will provide a detailed scope, cost estimate, and projected schedule. During the POR development process, funding sources are The POR is then identified and A/E firms are considered for the design. presented to the Board of Regents for approval. Once approved, a project budget is established by the Board of Regents and a preliminary design with costs is developed by an A/E firm. If the A/E's estimated costs exceed the limit, additional funding must be identified by the institution and approval must be granted by the Board to increase the project budget or the A/E will redesign the project for costs to fall under the project cost limit. The process continues with team design reviews and approval is obtained from the Texas Higher Education Coordinating Board. The FP&C staff is then responsible for selecting the

appropriate contracting vehicle and bids are solicited from contractors and the contract is awarded.

## 6.3.2 Organization

The FP&C Department is headed by the Executive Director who reports directly to the Deputy Chancellor. The Executive Director is supported by an Associate Executive Director and three divisions: Administration Division, Planning Division, and Construction Division. The FP&C main office is located in College Station and a branch office is located in Corpus Christi which oversees construction in south Texas: Corpus Christi, Kingsville and Laredo. The Construction Division is responsible for the construction administration of capital projects. Figure 6.2 presents the organization of the FP&C Department.

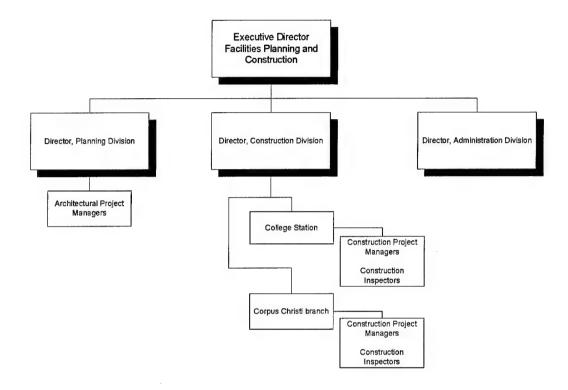


Figure 6.2. FP&C Organization

The Construction Division includes the following personnel. The responsibilities of each individual are described per the TAMU System position descriptions.

Director, Construction Division – supervises and manages the inspection, contract administration, and funding disbursement for all construction projects; maintains departmental staffing for current and projected workload and prepares the annual division operating budget; reviews, negotiates, and approves contract changes (up to \$10,000); and approves contractor invoices.

Construction Project Manager – supervises and manages the construction contract. Attends preliminary and detailed design review meetings for new construction projects; conducts pre-construction conferences; conducts or attends regularly scheduled project meetings; reviews and makes contract changes (up to \$5,000); coordinates and interprets project plans and specifications; and coordinates schedule and conducts final inspections.

Construction Inspector – inspects all material, equipment, and construction activities; maintains a daily journal of construction activities, decisions, and meetings; verifies and records additional work done; ensures material testing is accomplished in accordance with the contract plans and specifications; reviews contractor's cost proposal for additional work and approves contract changes (up to \$2,000); monitors contractor's safety standards and methods; and ensures construction is performed in conformance to the project plans and specifications.

## **6.4 ROICC TEAM EQUIVALENTS**

As found with the U.T. System's OFPC, the organization of FP&C's Construction Division is also analogous to the organization of NAVFAC's ROICC offices.

• The Construction Project Manager is the equivalent field representative to NAVFAC's Project Manager. Both individuals have

the similar responsibilities within their respective organizations with only minor differences.

• The Construction Inspector is the equivalent field representative to NAVFAC's Quality Assurance Representative.

After discussions with FP&C's Executive Director, it was revealed that the pre-award procurement responsibilities equivalent to NAVFAC's Contract Specialists were accomplished by the Architectural Project Managers located in FP&C's Planning Division. Additionally, the post-award contract functions were shared by the following FP&C individuals: Construction Inspector (contract actions up to \$2,000), Project Construction Manager (contract actions up \$5,000), Construction Division Director (contract actions up \$10,000) and the Executive Director (contract actions over \$10,000).

### 6.4.1 Qualifications

Table 6.1 presents TAMU System's required qualifications for the Construction Project Manager, Construction Division Director, Architectural Project Manager and Construction Inspector. As discussed in the previous section, the pre and post-award responsibilities of NAVFAC's Contract Specialist are shared by the Executive Director, Planning Division Architectural Project Manager and Construction Division Director, Construction Project Manager and Construction Inspector.

Table 6.1. TAMU System Qualifications for NAVFAC Equivalents

Description		ja jad 11		
	Construction Project Manager	Construction Division Director	Architectural Project Manager (Planning Division)	Construction Inspector
Education	BS degree in Architecture or Engineering	BS in Construction Mgmt, Engineering or Architecture	Bachelor's Degree in Architecture or equivalent training and experience	Bachelor's Degree in Architecture, Engineering or Building Construction
Experience	>10 years in construction with experience as project manager	>15 years experience in managing large construction programs	>10 years in design and construction including >3 years as Project Manager	>10 years in construction related work
Licenses, Certificates or Registrations	Registration as Professional Engineer <i>Preferred</i>	Registration as Professional Engineer <i>Preferred</i>	Registration as Professional Architect in Texas Required	None

### **6.5 SUMMARY**

The TAMU System is headquartered in College Station, Texas and is composed of nine universities throughout Texas including eight state agencies and a science health center. The Facilities Planning and Construction Department is responsible for the delivery of capital construction projects and reports to the Chancellor via the Deputy Chancellor.

The Capital Project Program is the System's program for major repair/rehabilitation and new construction projects. Major repair/rehabilitation projects and construction projects are defined as projects with costs exceeding \$2 million and \$1 million, respectively.

FP&C's Construction Project Manager and Construction Inspector were identified as the equivalents to NAVFAC's Project Manager and Quality Assurance Representative, respectively. FP&C's Executive Director, Planning

Division Architectural Project Manager, Construction Division Director,

Construction Manager and Construction Inspector collectively shared the pre and
post-award responsibilities of NAVFAC's Contract Specialist.

# **CHAPTER 7: THE DUPONT COMPANY**

This chapter provides an overview of the DuPont Company, discusses the role and organization of the Facilities Construction and Support (FC&S) Department, and identifies FC&S staff with equivalent positions and/or responsibilities to NAVFAC's ROICC Team.

#### 7.1 HISTORY AND MISSION

The DuPont Company was established as a black powder explosives company in 1802 by E.I. du Pont. The company quickly established itself as a quality powder manufacturer and grew rapidly. Three DuPont cousins purchased the company in 1902 to avoid the selling of the company to a competitor. In 1903, DuPont established the Experimental Station, an independent research laboratory pioneering industrial research. DuPont's commitment to research would lead to improvements in nitrocellulose-based synthetics and eventually a manufacturer of chemicals and materials.

World War I transformed the company into an industry giant as it supplied the Allies with 40 percent of the total explosives requested. Furthermore, Germany was the U.S.'s largest supplier of dyes prior to the war. The shortage of dye affected money printing and DuPont tackled the task of manufacturing synthetic dyes with great success.

With the acquisitions of smaller companies, DuPont added six new industrial departments by the 1930's. Rayon and cellophane are examples of products developed by the new departments. Cellophane was marketed with apparel and packaging and was very successful with the American consumers. Polymer science and technology also flourished and DuPont was responsible for the discovery of neoprene (synthetic rubber) and nylon. In 1935, DuPont penned the slogan, "Better things for better living through chemistry".

The U.S. government again relied on DuPont in World War II to substitute plastics for heavier materials. In 1938, Teflon was discovered and used in many military applications. The government also asked DuPont to design, construct, and operate a plant to produce plutonium. A plutonium device was detonated in the New Mexico desert in July 1945 and several weeks later the war ended with the dropping of two atomic bombs in Japan. DuPont left the nuclear business and wasn't involved again until the Cold War.

Through the late century, DuPont's continued research commitment developed further innovative products including: Lycra spandex fiber, Dacron polyester fiber, Kevlar brand fiber, Nomex fire-retardant material, Corian solid surface, Tyvek protective material, and Cordura textile fibers.

DuPont currently has more than 79,000 employees in 70 countries worldwide. DuPont owns 135 manufacturing/processing facilities and 40

research/development/customer service labs. In 2002, revenues totaled over \$24 billion (E. I. du Pont du Nemours and Company).

#### 7.2 ORGANIZATION

Repeated in corporate literature and websites, "DuPont is a science company" and the company is structured for market growth through core business areas. DuPont was recently ranked as the 70<sup>th</sup> largest U.S. industrial/service corporation by Fortune 500 (E. I. du Pont du Nemours and Company). DuPont's organization is complex and a thorough explanation would require a number of pages and figures. This section will provide a general overview of DuPont's organization and will identify the department responsible for construction administration of its manufacturing and process facilities, the Facilities Construction and Support Department.

DuPont is headquartered in Wilmington, Delaware. Six business areas report to the corporate office:

- Electronic and Communication Technologies
- Performance Materials
- Coatings and Color Technologies
- Safety and Protection
- Agriculture and Nutrition
- · Textiles and Interiors

The business areas utilize the Global Services group for business, legal, and consulting services. Global Services is composed of six areas: Asset Productivity Processes, Consulting Solutions, Value Chain Processes, Business

Services, Legal Services, and People Managing Processes. Under the Business Services group is DuPont Capital Asset Productivity (DuCap). DuCap is responsible for all capital project planning and execution.

The Facilities Construction and Support Department is a subdivision of DuCap and is responsible for the construction administration of DuPont's manufacturing/process facilities construction projects. A DuPont Company organization chart is presented in Figure 7.1.

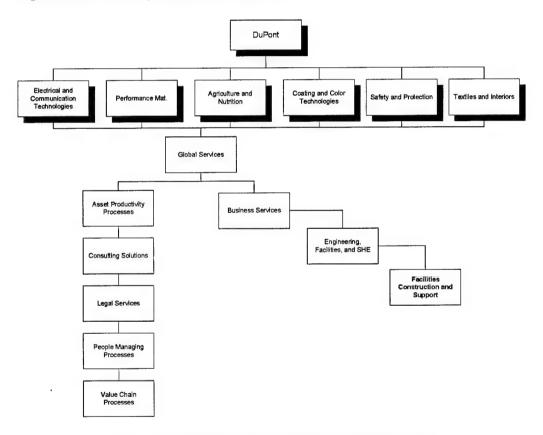


Figure 7.1. DuPont Company Organization Chart

#### 7.3 FACILITIES CONSTRUCTION AND SUPPORT DEPARTMENT

The Facilities Construction and Support (FC&S) Department is made up of engineers, consultants, safety professionals, and business personnel consisting of approximately 70 DuPont employees (also known as DuPonters) and 50 contracted support professionals from Washington Group International (WGI). The FC&S group provides support to DuPont businesses in construction and support contracting, project front-end loading (pre-project planning), craft technology, infrastructure maintenance, fleet management, and labor relations. This section will focus on the construction administration functions of the DuPonters within the FC&S Department.

## 7.3.1 Organization

A FC&S construction management team may be lead by one or all of the following individuals depending on the size and complexity of the project. The responsibilities of each individual are described per Dupont FC&S position descriptions.

Resident Manager – 15 plus years of construction experience, manages multiple projects totaling up to \$150 million, may be assigned to a large, single and foreign project up to \$100 million, and reports to a Regional Construction Manager.

Project Engineer – 10 to 15 years of construction experience, manages multiple projects up to \$100 million, and reports to the Resident Manager.

FC&S Engineer - 5 to 10 years of construction experience, manages multiple projects up to \$30 million, and reports to the Resident Manager.

The Resident Manager, Project Engineer, and FC&S Engineer are essentially responsible for the same construction administration duties – project scheduling, cost, safety, productivity, and quality.

The team of construction managers relies on the following FC&S team members for support.

Business Services Consultant – provides financial, administrative, and internal controls support to the Project Engineer at the project site. Duties include the development of the site operating budget, reporting monthly expenditures, contract administration, reviewing/approving site contractor progress payments, and training and assistance to the Construction Management Contractor. Depending on the level of experience, a Business Service Consultant is classified as an Analyst or Specialist. Business Services Consultants have regional responsibility and frequent the project site routinely or on an as needed basis.

FC&S Craft Consultant – provides technical expertise in design, safety, front-end loading, contracting, field support, quality, standards and technology. The Craft Consultants are classified into three disciplinary areas: Electrical/Instrumentation, Pipe/Mechanical, and Civil/Structural. The Craft Consultant plays a major role in the contractor's quality and may establish an inspection program. Craft Consultants have regional responsibility and frequent the project site routinely or on an as needed basis.

Safety Consultant – responsible for auditing site safety policies established by the Construction Management Contractor and construction contractor. Assists in the development of site safety skills and safety programs.

DuPont contracts for construction administration support with an Engineering and Procurement including Construction Management (EPCM) Contractor. The EPCM Contractor is utilized by DuPont on a majority of capital construction projects and the EPCM staff work under the direction of the FC&S Resident Manager for construction administration duties including costs, scheduling, safety, quality assurance, contractor change requests, and contractor invoices.

Figure 7.2 presents the organization of the FC&S construction administration team.

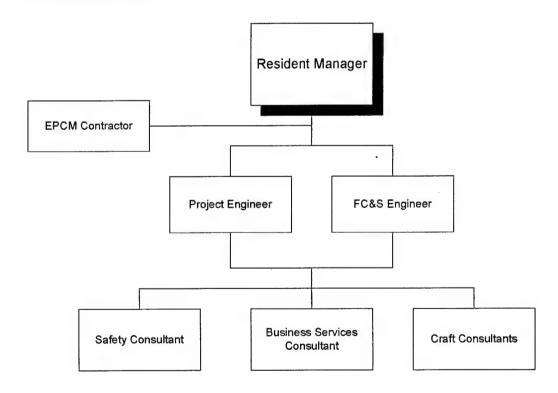


Figure 7.2. FC&S Organization Chart

### 7.4 ROICC TEAM EQUIVALENTS

Construction administration of the FC&S Department is focused on the construction of manufacturing/process facilities. FC&S staff does not manage conventional construction projects (i.e. commercial buildings and housing projects). The author interviewed a senior DuPont Resident Manager and reviewed FC&S documents detailing the project processes and staff duties. With input from the DuPont Resident Manager, the following FC&S individuals had similar construction administration responsibilities as the ROICC Team.

- The Resident Manager, Project Engineer, and FC&S Engineer are equivalent to NAVFAC's Project Manager.
- A Business Service Consultant is equivalent to NAVFAC's Contract Specialist.

No individuals within the FC&S Department have similar construction administration responsibilities as NAVFAC's *Quality Assurance Representative*. The FC&S Craft Consultants supervise the contractor's quality and may establish an inspection program. However, the responsibilities of NAVFAC's Quality Assurance Representative are found with individuals within the EPCM Contractor contracted by DuPont for construction administration.

### 7.4.1 Qualifications

Table 7.1 presents DuPont's required qualifications for the Resident Manger/Project Engineer/FC&S Engineer, Business Service Consultant and Quality Craft Consultant.

Table 7.1. DuPont Qualifications for NAVFAC Equivalents

		Position									
Description	Resident Manager <sup>(1)</sup> , Project Engineer <sup>(2)</sup> and FC&S Engineer <sup>(3)</sup>	Business Services Specialist (Bus. Controls and Solutions)	Quality Craft Consultant								
Education	BS or MS degree	BS degree in administrative, industrial, financial mgmt, business administration	See Experience								
Experience	>15 years <sup>(1)</sup> /10 - 15 years <sup>(2)</sup> 5 - 10 years <sup>(3)</sup> of construction experience	2 - 4 years experience	15+ years experience/performance of craft functions, leading others, study and observation								
Licenses, Certificates or Registrations	None	None	None								

### 7.5 SUMMARY

DuPont is a science company and owns 135 manufacturing/processing facilities and 40 research labs worldwide. DuPont is structured for market growth through six core business areas: Electronic and Communication Technologies, Performance Materials, Coatings and Color Technologies, Safety and Protection, Agriculture and Nutrition and Textiles and Interiors.

The FC&S Department is responsible for the construction administration of DuPont's *manufacturing/process facility* construction projects and is composed of approximately 70 DuPonters.

The Resident Manager, Project Engineer, and FC&S Engineer were identified as FC&S individuals with equivalent positions as NAVFAC's Project

Manager. The Business Service Consultant was identified as the equivalent position of NAVFAC's Contract Specialist. The responsibilities of NAVFAC's Quality Assurance Representative were not found within the FC&S Department but with individuals belonging to the EPCM Contractor. The EPCM Contractor is contracted by DuPont to support the FC&S Department with construction administration of manufacturing/process facility projects.

### **CHAPTER 8: DATA PRESENTATION**

This chapter presents essential assumptions required from each owner organization for successful apples to apples comparison of workload responsibility between the ROICC Team and industry equivalents. Subsequently, staff quantities and construction WIP data is presented from NAVFAC, The U.T. System, TAMU System, and the DuPont Company during the study period.

### 8.1 NAVFAC

NAVFAC Type I construction WIP dollars and staffing numbers were extracted from eight spreadsheets consisting of accumulated NFOR data. Each spreadsheet represents NFOR data from a specific reporting period. The following reporting periods were reviewed for this study.

- FY 2000: March 2000, June 2000, and September 2000
- FY 2001: November 2000, January 2001, and July 2001
- FY 2002: January 2001 and July 2001

Refer to Appendix A for NFOR spreadsheets.

61 of NAVFAC's 90 ROICC offices are located within the continental U.S. (CONUS). Therefore, data has been categorized into two groups: "NAVFAC" and "NAVFAC CONUS". The "NAVFAC" group includes data from all 90 ROICC offices whereas the "NAVFAC CONUS" group only consists of data

from CONUS ROICC offices. ROICC offices located outside the continental U.S. are referred to as OCONUS ROICC offices.

### 8.1.1 Assumptions

- The Project Manager and AROICC have identical construction administration functions within the ROICC office. Therefore, the quantity of NAVFAC Project Managers will include the cumulative total of AROICC's (NFOR code: "Military") and civilian Project Managers.
- The NFOR spreadsheets in Appendix A report total quantities for each position. The reports do not provide a breakdown of rank for CEC officers or grade level for civilian positions. A 15% reduction was applied to the annual "Military" quantities. This reduction removed senior CEC officers, more specifically ROICC's, from the NAVFAC totals to obtain an accurate estimate of AROICC's.
- The annual quantities for "K" personnel, provided in Appendix A, were reduced by 75% to account for various the contract types administered by Contract Specialists. 25% of total Contract Specialists was used to obtain an approximate quantity of Contract Specialists responsible for Type I construction contracts. This estimate was derived after consulting with a senior NAVFAC REICC.

### 8.1.2 Data

Table 8.1 presents "NAVFAC" Type I construction WIP and staffing data during FY 2000 through FY 2002. "Military" is a NFOR code and refers to Civil Engineer Corps Officers (CEC) assigned to ROICC offices. NFOR position codes "PM", "K", and "QA" represent civilian Project Managers, Contract Specialists and Quality Assurance Representatives, respectively.

Table 8.1. NAVFAC Data for FY 2000 through FY 2002

FY	WIP (Type I, \$M)	Military	РМ	K	QA	Total
00	3068.333	203	271	84	432	990
01	3063.333	202	249	89	440	980
02	3082.500	216	243	98	415	970
Mean	3071.389	207	254	90	429	980
Std Dev	9.942	8	15	7	13	10

For the study period, the construction WIP mean for "NAVFAC" was approximately \$3,071 million with a standard deviation of approximately \$10 million. The mean total staff quantity observed was 980. The mean quantity of CEC officers, Project Managers, Contract Specialists and Quality Assurance Representatives was 207, 254, 90 and 429, respectively.

Table 8.2 presents "NAVFAC CONUS" construction WIP and staffing during FY 2000 through FY 2002.

Table 8.2. NAVFAC CONUS Data for FY 2000 through FY 2002

	1.			Staffing		The state of the s				
FY	WIP (Type I, \$M)	Military	PM	K	QA	Total				
00	2294.627	154	206	62	298	720				
01	2260.893	152	186	63	306	707				
02	2251.220	162	176	69	279	686				
Mean	2268.913	156	189	65	294	704				
Std Dev	22.788	5	15	4	14	17				

For the study period, the "NAVFAC CONUS" WIP mean was approximately \$2,269 million with a standard deviation of approximately \$23 million. The mean total staff quantity observed was 740. The mean quantity of CEC officers, Project Managers, Contract Specialists and Quality Assurance Representatives was 156, 189, 65 and 294, respectively.

In comparing triennial numbers between "NAVFAC" and "NAVFAC CONUS", it was noted that OCONUS ROICC offices accounted for approximately \$800 million (26%) of NAVFAC's \$3,071 million Type I construction WIP. Taking into account the assumption of Type I Contract Specialists as previously stated, OCONUS ROICC offices accounted for approximately 28% of NAVFAC's Project Managers, Contract Specialists, and Quality Assurance Representatives.

#### 8.2 THE U.T. SYSTEM

The Assistant Vice Chancellor for Facilities Planning and Construction provided two OFPC spreadsheets for review: (1) an department analysis spreadsheet from FY 98 through FY 03 containing the history of staffing (based on budgeted and filled full time equivalents), budget (projected and actual), and activity (total dollars processed, active projects, and Capital Improvement Plan projects) and (2) a budget/staffing history spreadsheet from FY 98 through FY 03 detailing the number of OFPC positions budgeted, filled, and contracted. Additionally, the Vice Chancellor allowed the author to review OFPC's General Project Delivery Process Guidelines and Reference Manual. Refer to Appendix C for OFPC information and data.

### 8.2.1 Assumptions

- The Assistant Vice Chancellor of Facilities and Construction recommended reducing OFPC's total processed dollars by 30% to achieve an accurate estimate of construction WIP dollars.
- With respect to construction contracts only, the pre and post-award contractual duties (duties similar to NAVFAC's Contract Specialist) of the Senior Project Manager, Resident Construction Manager and Construction Inspector were minor and will be ignored.

 Annual staff quantities for Project Managers will be reduced to 10% and will be included with the annual quantity for the Contract Manager. The annual quantity of Project Managers during the study period was 20 and was assumed constant; therefore, a total of three Contract Managers worked for OFPC during the study period.

### 8.2.2 Data

Table 8.3 presents OFPC construction WIP and staffing data for FY 2000 through FY 2002. "RCM" and "CI" represent the Resident Construction Managers and Construction Inspectors, respectively. "CM" represents the collective total of the Contract Manager and Project Managers.

Table 8.3. U.T. System Data for FY 2000 through FY 2002

			Staffin	Staffing						
FY	Dollars Processed (\$M)	Construction WIP (\$M)	RCM	СМ	CI	Total				
00	290.000	203.000	11	3	18	32				
01	320.000	224.000	11	3	18	32				
02	360.000	252.000	14	3	20	37				
Mean	323.333	226.333	12	3	19	32				
Std Dev	35.119	24.583	2	0	1	3				

For the study period, the construction WIP mean was approximately \$226 million with a standard deviation of \$25 million. The mean total staff quantity observed was 32. The mean quantity of Resident Construction Managers, Contract Managers and Construction Inspectors was 12, 3 and 19, respectively.

### 8.3 TAMU SYSTEM

The Executive Director of the Department of FP&C offered numerous documents detailing contract processes and staff position descriptions for review. The handouts consisted of a FP&C overview, organization charts, Capital Project Planning information, construction expenditures from FY 98 through FY 2002, and department position descriptions/qualifications. Refer to Appendix D for FP&C information and data.

### 8.3.1 Assumptions

- The Executive Director of FP&C Department recommended reducing the department's total processed dollars by 25% for an accurate estimate of construction WIP dollars.
- With respect to construction contracts only, the pre and post-award contractual duties (duties similar to NAVFAC's Contract Specialist) of the Construction Project Manager and Construction Inspector were minor and will be ignored.
- Staff quantities for all positions were constant during the study period.

#### 8.3.2 Data

Table 8.4 presents FP&C Department construction WIP data and staffing data for FY 2000 through FY 2002. "CPM" and "CI" represent Construction Project Managers and Construction Inspectors, respectively. "PM" represents the

collective total of Planning Division Project Managers, Construction Division Director and the Executive Director.

Table 8.4. TAMU System Data for FY 2000 through FY 2002

		,		Staffing	 	
 FY	Dollars Processed (\$M)	Construction WIP (\$M)	СРМ	РМ	CI	Total
 00	118.000	88.500	4	4	11	19
01	94.000	70.500	4	4	11	19
02	110.000	82.500	4	4	11	19
Mean	107.333	80.500				
Std Dev	12.220	9.165				

For the period study period, the construction WIP mean was approximately \$81 million with a standard deviation of approximately \$9 million. FP&C staff quantities were assumed to be constant during the study period.

### **8.4 THE DUPONT COMPANY**

A senior DuPont FC&S Construction Manager was interviewed over the phone and provided the following documents for review: organizational structure, yearly construction volume, Production Design Basis manual, constructability checklists, FC&S scope of work checklists, and department position descriptions/qualifications. Refer to Appendix E for FC&S information and data.

### 8.4.1 Assumptions

- The Construction Manager suggested reducing the project volume dollars by 39% to achieve an accurate estimate of construction WIP dollars. 61% of the total project volume was derived from the Construction Manager's experience with DuPont projects and their typical cost breakdown: 8% for indirect field costs, 27% for labor, and 26% for field material. Additionally, annual construction volume was provided in calendar years and not fiscal years.
- Costs of foreign projects make up a minute percentage of the annual project volume and will be ignored.
- Annual project volume numbers were reported in calendar years;
   therefore, assume the data is an accurate estimate for fiscal year numbers.
- Staffing quantities for all positions were constant during the study period.

### 8.4.2 Data

Table 8.5 presents FC&S Department construction WIP data and staffing data for calendar years 2000 through 2002. "RM", "BSC", and "CC" represent the Resident Managers, Business Service Consultants and Craft Consultants, respectively.

Table 8.5. DuPont Data for FY 2000 through FY 2002

				g			
Year	Project Volume (\$M)	Construction WIP (\$M)	СМ	BSS	QCC	Total	
00	1900.000	1159.000	41	21	8	70	
01	1500.000	915.000	41	21	8	70	
02	1400.000	854.000	41	21	8	70	
Mean	1600.000	976.000					
Std Dev	264.575	161.391					

For the study period, the construction WIP mean was approximately \$976 million with a standard deviation of \$161 million. As discussed in Chapter 8, FC&S Department staff quantities were assumed constant during the study period.

### 8.5 SUMMARY

NAVFAC construction WIP and staffing data was presented during FY 2000 and FY 2002. NAVFAC data was categorized into two groups: "NAVFAC" and "NAVFAC CONUS". The "NAVFAC" group includes data from all 90 ROICC offices whereas the "NAVFAC CONUS" group only consists of data from the 61 CONUS ROICC offices.

The U.T. System's total processed dollars and staffing data was presented during the study period. Total processed dollars were reduced by 30% to achieve an approximate estimate comparable to NAVFAC's Type I WIP construction.

TAMU System's total processed dollars and staffing data was presented during the study period. Total processed dollars were reduced by 25% to achieve an approximate estimate comparable to NAVFAC's Type I WIP construction.

The DuPont Company's total project construction volume and staffing data was presented during the study period. Total processed dollars were reduced by 39% to achieve an approximate estimate comparable to NAVFAC's Type I WIP construction.

Chapter Nine will compare workload responsibility for each ROICC Team individual and compare to equivalent positions The U.T. System, TAMU System and The DuPont Company. Assumptions will be necessary for successful apples to apples comparison between the owner organizations and will be presented in Chapter Nine.

## **CHAPTER 9: QUANTITATIVE COMPARISON**

This chapter presents an analysis and comparison of workload responsibility between NAVFAC and the industry owner organizations. The analysis is presented and organized consistently with NAVFAC's ROICC Team: Project Manager, Contract Specialist, and Quality Assurance Representative.

### 9.1 CONSTRUCTION WORKLOAD RESPONSIBILITY

As discussed in Chapter Three, workload responsibility is defined as:

Annual Construction Work-in-Place (\$) / Quantity of Personnel

An analysis and comparison of construction workload responsibility is now presented for NAVFAC's Project Manager, Contract Specialist, and Quality Assurance Representative.

#### 9.2 PROJECT MANAGER

Figure 9.1 presents the annual average workload responsibility for NAVFAC's Project Manager and industry equivalents (identified in Chapters Five, Six and Seven) during the study period.

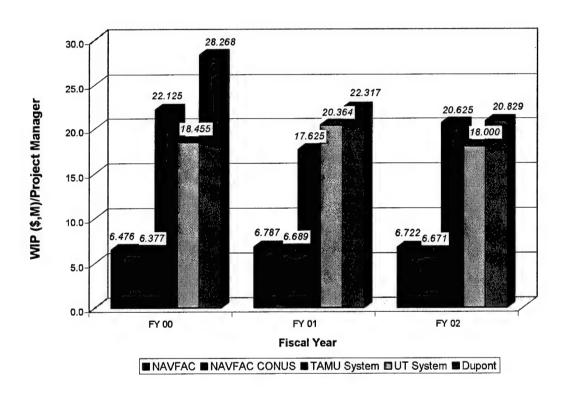


Figure 9.1. Mean Workload Responsibility for NAVFAC Project Manager and Industry Equivalents

The "NAVFAC" mean and standard deviation for the study period is approximately \$6.7 million and \$0.2 million, respectively. The "NAVFAC CONUS" mean and standard deviation is approximately \$6.6 million and \$0.2 million, respectively. The OCONUS ROICC offices exhibited a relatively small influence to the "NAVFAC" totals.

The workload responsibility mean and standard deviation for the TAMU System equivalent was approximately \$16.1 million and \$1.8 million, respectively.

The workload responsibility mean and standard deviation for The U.T. System equivalent was approximately \$18.9 million and \$1.3 million, respectively.

The workload responsibility mean and standard deviation for The DuPont Company equivalent was approximately \$27.0 million and \$4.5 million, respectively.

NAVFAC Project Managers had the lowest level of workload responsibility among all owner organizations. The equivalents from the industry organizations were clustered near the \$20 million level. NAVFAC's level of responsibility can be partially attributed to the rotation of CEC officers in AROICC positions. CEC officers have opportunities to transfer to other CEC duties in facilities management and the Naval Construction Force (Seabees), to name a few, during their naval careers. An AROICC position is not permanent and the average tour is approximately two years. Also, it is not uncommon for junior CEC officers with little or no construction experience to manage high value construction projects.

### 9.3 CONTRACT SPECIALIST

Figure 9.2 presents the annual average workload responsibility for NAVFAC's Contract Specialist and industry equivalents as identified in Chapters Five, Six and Seven.

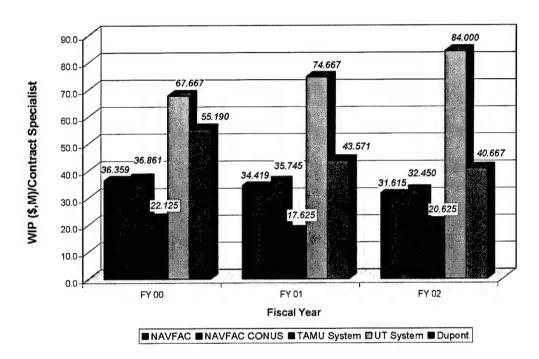


Figure 9.2. Mean Workload Responsibility for NAVFAC Contract Specialist and Industry Equivalents

The "NAVFAC" mean and standard deviation for the study period is approximately \$34.1 million and \$2.4 million, respectively. The "NAVFAC CONUS" mean and standard deviation is approximately \$35.0 million and \$2.3 million, respectively.

The workload responsibility mean and standard deviation for the TAMU System equivalent was approximately \$20.1 million and \$2.3 million, respectively.

The workload responsibility mean and standard deviation for The U.T. System equivalent was approximately \$75.4 million and \$8.2 million, respectively.

The workload responsibility mean and standard deviation for The DuPont Company equivalent was approximately \$45.0 million and \$7.4 million, respectively.

The U.T. System Contract Manager had the highest level of responsibility with a mean of \$75.4 million during the study period. NAVFAC, TAMU System, and The DuPont Company were consistent and clustered near the \$35 million level. The U.T. System places a high level of accountability on its Contract Manager to streamline contract processes and is ultimately responsible for all post-award contract actions. Although the authority to authorize contract changes is delegated to the Resident Construction Manager and the Construction Inspector, a final approval and document signature is required from the Contract Manager for all contract changes. As stated in Chapter Five, pre-award construction duties were shared by the Contract Manager and Project Managers and the "Contract Manager" totals presented in Chapter Eight, Section 8.2.1, included the annual sum of the Contract Manager and Project Managers.

A cursory review of position qualifications in Table 9.1 shows consistency among NAVFAC, The U.T. System, and DuPont. TAMU System has the greatest requirements for its NAVFAC equivalent. However, the pre and post-award contract duties of NAVFAC's Contract Specialists are shared by TAMU's Project Manager, Construction Inspector, Project Construction, Construction Division Director and the Executive Director. TAMU's Project Manager is also responsible for technical and design reviews and coordination with A/E firms.

Table 9.1. Qualifications for NAVFAC Contract Specialist and Industry Equivalents

		Organ	ization	
Description	NAVFAC	UT System Equivalent	TAMU System Equivalent	Dupont Equivalent
Position	Contract Specialist (Grade GS-9)	Contract Manager (Project Controls Group)	Construction Division Director	Business Services Specialis (Bus. Controls and Solutions
Education	Bachelor's degree w/a major in any field or at least 24 semester hours in any combination of specific fields*	BS degree in Architecture or Engineering	BS in Construction Mgmt, Engineering or Architecture	BS degree in administrative industrial, financial mgmt, business administration
Experience	1 year equivalent experience as GS-5 and 1 year as GS-7	>5 years project management experience	>15 years experience in managing large construction programs	2 - 4 years experience
Licenses, Certificates or Registrations	None	None	Registration as Professional Engineer Preferred	None

### 9.4 QUALITY ASSURANCE REPRESENTATIVE

Figure 9.3 presents the annual average workload responsibility for NAVFAC's Quality Assurance Representative and industry equivalents as identified in Chapters Five, Six and Seven.

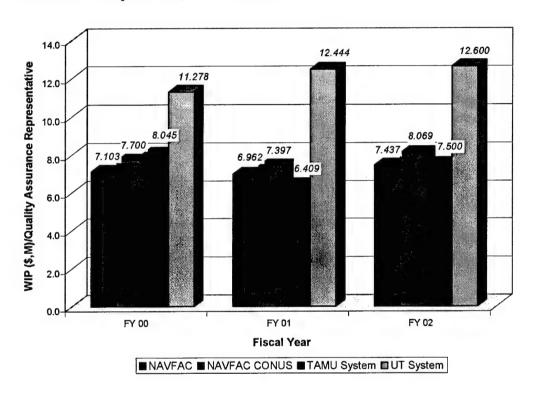


Figure 9.3. Mean Workload Responsibility for NAVFAC Quality Assurance Representative and Industry Equivalents

The "NAVFAC" mean and standard deviation for the study period is approximately \$7.2 million and \$0.2 million, respectively. The "NAVFAC CONUS" mean and standard deviation is approximately \$7.7 million and \$0.3 million, respectively.

The workload responsibility mean and standard deviation for the TAMU System equivalent was approximately \$7.3 million and \$0.8 million, respectively.

The workload responsibility mean and standard deviation for The U.T. System equivalent was approximately \$12.1 million and \$0.7 million, respectively.

As previously stated in Chapter Seven, the DuPont FC&S Department does not have an equivalent to NAVFAC's Quality Assurance Representative. However, a review of Table 8.5 shows an average responsibility of \$112 million for DuPont's Quality Craft Consultants during the study period.

The U.T. System Construction Inspector had the highest level of responsibility averaging \$12 million during the study period. NAVFAC, TAMU System, and The DuPont Company were consistently clustered around \$7.5 million.

A cursory review of Table 9.2 reveals that NAVFAC and the U.T. System have similar qualifications for mid-grade Quality Assurance Representatives.

TAMU System had the highest level of requirements including a Bachelor's Degree and more than ten years of construction experience.

Table 9.2. Qualifications for NAVFAC Quality Assurance Representative and Industry Equivalents

	Organization										
Description	NAVFAC	UT System Equivalent	TAMU System Equivalent								
Position	CONREP (Grade GS-4)	Construction inspector	Construction Inspector								
Education	High school diploma or equivalent and 2 years of courses above high school related to the occupation*	High school diploma or GED equivalent	Bachelor's Degree in Architecture, Engineering or Building Construction								
Experience	>6 months experience as CONREP	>5 years experience in maintenance and construction	>10 years in construction related work								
Licenses, Certificates or Registrations	None	None	None								

### 9.5 TOTAL STAFF

"Total Staff" is defined as the cumulative total of NAVFAC Project Managers, Contract Specialists, and Quality Assurance Representatives. Therefore, annual average workload responsibility for each individual is calculated by dividing the annual construction WIP dollars by the "Total Staff". The same method is applied to the industry organizations to calculate an average workload responsibility per individual. Figure 9.4 presents construction workload responsibility per individual.

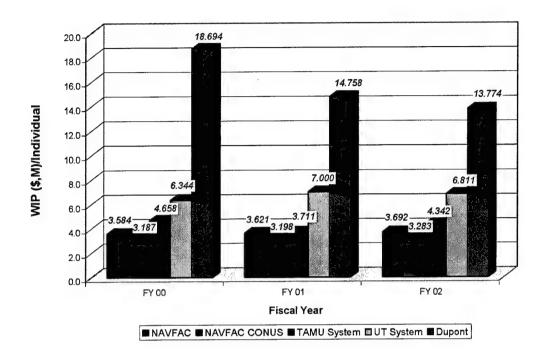


Figure 9.4. Individual Mean Workload Responsibility for Owner Organizations

The "NAVFAC" mean and standard deviation for the study period is approximately \$3.6 million and \$0.1 million, respectively. The "NAVFAC CONUS" mean and standard deviation is approximately \$3.2 million and \$0.1 million, respectively.

The workload responsibility mean and standard deviation for a TAMU FP&C individual was approximately \$4.2 million and \$0.5 million, respectively.

The workload responsibility mean and standard deviation for a U.T. System OFPC individual was approximately \$6.7 million and \$0.3 million, respectively.

The workload responsibility mean and standard deviation for a DuPont FC&S individual was approximately \$15.7 million and \$2.6 million, respectively.

DuPont had the highest level of average individual responsibility among the owner organizations. As discussed in Chapter Seven, the FC&S Department is responsible for the construction administration of manufacturing/process facilities. The department is not responsible for typical construction projects common with the other owner organizations. DuPont's capital projects are more complex and higher in cost when compared to the typical construction projects. The projects also include the installation of expensive process equipment which accounts for a percentage of DuPont's annual construction volume. Additionally, DuPont contracts construction administration support from a construction management contractor to support the FC&S staff with capital projects. The EPCM Contractor is utilized by DuPont on most capital projects and the EPCM staff work under the direction of the FC&S Resident Manager for construction administration duties including costs, scheduling, safety, quality assurance, contractor change requests, and contractor invoices.

### **CHAPTER 10: CONCLUSIONS AND RECOMMENDATIONS**

#### **10.1 CONCLUSIONS**

- The mean annual workload responsibility for FY 2000 through FY 2002 for NAVFAC's Project Managers, Contract Specialists and Quality Assurance Representatives was \$6.7 million, \$34.1 million and \$7.2 million, respectively.
- Personnel were identified within the selected industry organizations as NAVFAC equivalents or with similar ROICC Team duties.
  - a. The U.T. System Resident Construction Manager, Contract Manager
     Project Manager and Construction Inspector
  - b. TAMU System Construction Project Manager, Planning Division
     Project Manager, FP&C Executive Director, Construction Division
     Director and Construction Inspector
  - c. The DuPont Company Resident Manager, Project Engineer, FC&S
     Engineer, and Business Service Consultant
- 3. NAVFAC's Project Managers had the lowest level of workload responsibility of all four owner organizations. NAVFAC's level of workload responsibility for Project Managers can be attributed to two factors: (1) NAVFAC's Project Managers are composed of civilians and Navy CEC Offices. CEC officers have opportunities to transfer to other CEC duties and the AROICC positions

are not permanent - the average AROICC tour is approximately two years. (2) Civilians with substantial experience in industry are easier to remove from their positions than civilians within NAVFAC. During low workload periods and downsizing, special procedures are executed by NAVFAC (e.g. early retirement and separation pay) to reduce the workforce. These procedures are not immediate and typically require planning and time to complete.

- The mean workload responsibility for NAVFAC's Contract Specialists was consistent with the equivalents from the TAMU System and DuPont.
- The mean workload responsibility for NAVFAC's Quality Assurance
   Representative was consistent with the TAMU System equivalent.
- 6. With respect to the mean workload responsibility per individual, NAVFAC was consistent only with the TAMU System. From a recovery fee standpoint, NAVFAC charges its customers eight percent of the total construction project cost for new, one-time construction contracts (for construction contracts funded by Other Than Navy and Marine Corps O&M and Military Construction dollars). It should also be noted that a percentage of NAVFAC's construction contracts are mission funded (i.e. paid via the activity's annual budget) and a recovery fee is not assessed to its customers. The U.T. System and TAMU System charge up to four percent of the total cost for all phases of the project: pre-project planning, design and construction.

- 7. NAVFAC is a federal organization and its mission is to support the military readiness of the U.S. Navy and Marine Corps combat forces through the planning, design, and construction of shore facilities. The majority of ROICC office civilians are part of the General Schedule pay scale. NAVFAC, as with all federal organizations, are bound by statutes that determine how the staffing, replacement, and transferring of civilians are dictated.
- 8. The U.T. System and TAMU System are public organizations that provide the opportunity of high-quality education through undergraduate, graduate, and professional schools. Human resource issues must comply with the Systems' policies, state laws and federal laws.
- 9. The DuPont Company is a private manufacturing company. Unlike federal and public organizations, DuPont's mission is to provide a product to consumers. DuPont's capital projects are complex and include the installation of expensive process equipment. DuPont contracts for construction administration support from a construction management contractor to support the FC&S staff with complex capital projects.

### 10.2 RECOMMENDATIONS FOR FURTHER STUDY

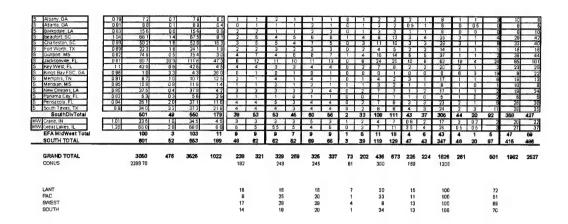
- Analyze the construction administration fees of all four owner organizations and compare the type and level of services paid for by the organizations' respective customers.
- Analyze NAVFAC workload responsibility for the ROICC Team and all other
  positions listed in the NFOR spreadsheets using data from the earliest years
  available through the present. Determine factors and identify trends that
  influenced the staffing of ROICC personnel.
- 3. Analyze workload responsibility between professional construction management firms.

# APPENDIX A: NAVFAC NFOR DATA

Typel Factor Typell Factor Service Factor Afc Factor Afs Factor	1.8 OS LANT 1.16 1 OS PAC 1.16 2 \$70M 4 2 PACTOR		MII K T Q	6.3 7.5 10.0 3.0 9.0	16 % 13 % 10 % 33 % 11 %	Крт	8.0	17 % 100 %				Mar	-00
	FY00 FY0 Type I Typ		MIL	$\mp$				Construction Civilian/CAS			Service	θ	Grand Total
	WP W	IP WIP WIP	Total		4 41-	К	D=1			Tota		1	Total Algo
Div Field Office	ACF \$M \$M			Algo	K Algo	PM	Algo	T Algo	Q Algo	A Algo Stat	KIA	Algo	Staff Staff
L Norfolk L NNSY	0 92 90 3 0 92 80 6	27 2 117 5 18 15 5 86 1 35	7 3	9	11 10 13 0	- 8 B	10	1 7	24 25 15 20	9 8 59 5 7 45	B 4	18	69 84 68 78
L Cherry Point L Jacksonville, NC	0 94 47 5 0 94 95 0	25 50 0 10 5 0 100 0 13	0 6	5	6 4	3	5	5	6 10 20 17	5 3 28 7 6 44	3	5	28 35 47 58
L Little Creek L Oceana	0 92 12 9 0 92 47 5	63 192 4 96 571 3	5 1	2	3 2 5 5	1 3	2 E	1 4	B 5	4 2 17 3 4 24	2 1	2	19 16 27 39
L Yorktown L Azores	0 92 28 5 1 34 6 7	126 411 4 04 71	4 2	5	4 4	- 1	5	3 0	6 10	3 3 16 1 0 2	3 1	2	20 32
L Gamo	1 35 14 3 1 26	0 B 15 1 14		0	1 1	-	0	1 0	3 3	4 1 11	3 1	7	15 16
L Panama L Iceland	1.06	23 463 32		0	1 2	2	0	0 2	3 5	0 0 4 2 13	2 1	0	6 0 16 26
L Roosevet Roads	13 618	33 651 42 86 614 17	8 0	B 67	4 5	5	6	2 36	9 13 106 120	4 4 30 49 40 26	5 3	22 86	38 60 338 449
N New Landon N Brunswick	1.04 41 1 0 95 19 1	2 2 43 3 22 1.0 20 1 1	0 4	4 1	4 3	4	4	B 2	8 B	4 3 24	1 2	1	27 35 12 13
N North Maine N Portsmouth	0.95 6.6 1.04 17.6	03 69 0 08 185 6	9 0	1 2	1 1	1	1 2	0 0	3 1 2 3	0 0 5	0 1	9	8 5 13 14
N Earle N Lakehurst	1.21 17.0 1.17 15.0	09 179 6 08 158 5	3 2	1	1 1	1	2	0 1	4 3	1 1 9 2 1 P	1 1	3	11 12 11 11
N East PA	1 06 20 5	11 216 6	3	2 2	3 2	3	2	0 1	4 4	1 1 14	3 0	3	16 15 11 12
N Mechanicsburg N Philadelphia	1 08 16 2	09 171 11	2	2	1 1	1	2	0 1	3 3	1 1 8	4 0	5	12 15
NorthDiv Total	1.07 56.4 225	30 594 13 12 237 7		21	5 4 22 18	23	B 22	0 3	10 11 43 45	16 16 12	6 13 9	39	29 40 149 173
C Elethesda	0.95 D.95 29.0	96 386 24	6 2	4	6 4	5	4	4 3	3 8	4 3 24	.8 1	13	0 0 33 38 55 84
C NOW C Dahlgren	0.95 96.3 0.9 25.2 0.91 30.5	24 1 120 4 24 1 3 26 5 4 1 6 32 1 8	6 2	3	4 10	7	12	11 7	11 24	7 9 48 3 2 14	B 1	12	15 19
C BRAC	0 91 30 5 0 95 57 8	0.0 57.8 0	2 5	5	2 3	2	5	10 3	2 6	1 2 11 2 4 22	0 0	- 4	15 23 22 33
C PAX River C Quantico	0 89 17 4 0 92 50 0	74 24 B 28 27 52 7 6	3 4	5	2 2	2	3	3 2	2 6	3 2 15 3 4 18	12 3 3 3	15	30 33 24 35
C JUSNA EFA Ches Total	09 57 1 363	30 601 7 50 413 100		δ 40	4 5 26 34	31	6 42	5 4 42 26	23 64	4 4 26 27 28 17	3 0 8 36 9	63	29 41 223 306
M Aviano M Vicenza	1 33 57 0 1 33 7 6	30 600 0 04 80 0	1	5	2 5	4	6	0 0	8 11	3 4 22	0 0	0	7 5
M La Maddalena M Sigonella	1 37 1 2 1 32 50 4	02 14 3 15 519 10	1 0	D 5	1 D 1 4	1	0	0 0	1 0	0 0 4	3 4	2	11 3 3 35
M London M Rota	112 180	02 20 2 10 200 B	5	0 2	4 0	1	0	0 1	7 0	3 0 21 0 1 4	3 2	1	26 2 6 17
M Souda Bay M Bahrain	0 74 4 5 1 46 6 0	05 50 1 10 70 2		1	1 1	3	1	0 0	4 1	1 D 11 1 D 7	8 2		19 5
M   Caird M   Southern Italy	131 04	01 05 0 02 30 10	2	D D	1 0 0 0	0	0	1 0 0 0	0 1	1 0 6 0 D 0	0 0	0	7 O
M OCC Naples  EFA Med Total	1 29 69 1	00 691 0 8 228 3	5	B 21	2 5 15 17	23	6 22	8 4 9 13	13 13 43 44	7 4 44 17 16 12	0 0 8 16 10	20	44 39 163 162
P IMCEH		165 1492 391 0 0 74 5 0	112	139	117 117 30 5	115 7 0	146 6	63 88 00 4	214 293	109 99 72		197	863 1079 23 37
P Pearl Harbor P Kaho'olawe	147 1478	65.0 212.8 75	80 1	18	25 D 15 8 D 5	12 0	19	30 11 00 4	26 38 5 12	10 13 84 1 4 18	28 10	37	122 152 19 37
P Mananas P Singapore	189 896 15 55	40 0 40 0 0 16 0 105 6 35 0 0 5 5 3	30	7	70 6	8.0	8	00 5	11 15	4 5 34 0 0 4	4 1 25 0	15	38 62
P Dego Garda	245 51 227 00	15 66 0	0.0	0	0.0	20	0	00 0	1 1	1 D 4	0 0	0	4 3
P Orcc FE/Yoka P Sasebo	156 277 156 74	00 00 22 108 386 23 18 82 11		4	00 0 20 3 20 1	50	4	00 2	6 B	2 3 1B 3 1 10	1 1	11	21 35 10 11
P Okinawa	15 26 7 165 90	43 310 30 18 108 11		3	40 2	20	3	00 2	7 6	3 2 20	0 0	15	20 32
P Atsugi P Iwakuni	1 56 6 3	03 66 3	10	1	10 D	0.0	3	DD D	3 1	0 0 5	0 0	2	5 5
P Chinhae P Misava	1 07 0 6 1 64 0 3	00 06 0 01 04 0	00	0	10 0	0.0	0	00 0	1 0	0 0 0	0 0	0	2 1
PAC Total SW   Barstow	1 17 17 7	142 642 217 18 185 2	10	2	55 40 30 1	<b>46</b> 3.0	49	3 30	76 99	28 33 23 1 1 θ	20	103	291 400 10 12
SW China Lake SW Coronado	1 26 29 1 1 1 35 8	39 330 17 52 410 6	40 4	3 4	6.0 2 4.0 3	6.0 2.0	4	2	6	1 2 16 2 3 12	50 10 40 20	3	22 26 19 27 7 11
SW El Centro SW Miramar	1 14 B 5	81 812 81 172 1821 4	10	7	20 1 40 6	7.0	8	1 5	2 15	0 1 5 4 5 18	20 30 40	5	7 11 25 50 64 79
SW Camp Pendleton SW Ventura County	1 13 40 2	7 0 47 2 16	6.0	12 4	170 1D 60 4	23 D 15 O	13	9	25 9	7 B 56 4 3 31	60 20 50 30	2	64 79 38 35
SW San Diego	1 2 2 7	27 D-	20	3	0 50 0 6 0 3	1.00	3	2	6	1 0 3	0.5 5.0 2.0	5	3 2 19 24
SW Point Loma SW El Toro (closed)	1 1 22 9	50 279 5	20 ;	3	40 2	4 0	3	2	6	4 2 14	40 30	3	21 20 0 0
SW Los Angeles SW 29 Paims	1 12 7 4 1 29 31 3	08 83 3: 25 338 0	20 3	3	40 1 30 2	6 0 6 0	3	2	2 6	2 1 12 2 13	30 30 10 10	2	16 6 15 16
SW Yuma SWDiv Total	1 12 25 D 489	4 0 29 0 3 1 60 649 88	34 4	3 45	20 2 62 38	3 0	3 47	D 28	6 0 94	1 2 7 31 31 20	2 D 43 21	42	9 16 270 326
NW Brementon NW Everett	1.16 83	4 12.3 20 0 65 6 45 6	4	1	1 1 0 0	3	1	3 1 2 0	2 3	2 1 15	10	1D 3	25 18 12 7
NVV NAS Whidby Island NVV Fallon	1 15 23 4 1 16 16 4	28 26 20 40 204 17	30	2	10 2	0.5	2	5 1 05 1	2 5 3 4	0 2 11 2 13	5	12 B	18 27 14 21
NW Silverdale EFA NW Total	1 111 25 3 79	0 78 26 08 55 12 91 127	. 6	2 8	0) 2 6 7	8	2	5 1 16 6	3 5 11 17	2 2 17 7 6 6	12	27 61	29 41 96 113
CW Concord CW San Francisco	1.16 6.2	10 72 0 512 533 0	10	1 B	10 1 40 6	1 5	1 B	0.5 0 1.0 5	2 1 3 16	1 0 7 0 5 13	D D	0	71 4
CW Lemoore CW Monterey	1 05 51 7	0.61 5231 2	10	5 2	40 4 50 1	2.5 1.5	5	D5 3	6 10	3 3 20	0	1 3	21 30
CW Traws	1 18 48 6	0 6 20 7 6 1 1 7 50 3 0 0	30 4	4	40 4 18 16	30	4	10 3	3 9 16 39	0 1 10 4 3 18 8 13 6	0	ğ	10 14 18 26 69 122
SWEST TOTAL		127 824 22		72	98 80	100	76	19 46	27 151	48 50 33		107	436 561

S Albany, GA	D 79	7.6	0.7	8.3	6 0	1	1	2	- 1	1	1	0	1	. 2	2	2	1	В	1	1	3	10	
S Atlanta, GA	0.01	8.8	01	8.8	0.3	D	1	1	1	2		0	1	2	2	0.5	- 3	- 8	D	0.5	0	. 8	5
S Barksdale LA	0.93	18 8	0.0	18.8	Q Q	3	2	1	2	1	2	0	1_1_	4	4	_1		10	0		0	10	11
S Beaufort SC	1 04	67.0	14	69 4	9 1	3	6	3	. 5	4	6	1	4	10	13	3	4	24	3	1	4	28	42
S Charleston, SC	0.89	55 6	18]	57 4	16.3	4	- 5	4	. 5	7	В	0	3	10	.12	4	4	29	. 2	1		32	43
S Fort Worth, TX	0.89	22 3	1.8	24 1	1 8	3	2	3 .	2	3	ä	0	2	4	- 6	2	2	15	_1_	1	1	17	16
5 Gulfport, MS	0.92	76 3	0.5	76.0	3.0	4	7	3	6	6	7	9	4	15	14	5	- 5	33	. 1	1 1	2	35	44
5 Jacksonville, FL	0.91	B4 B	30.9	115 7	47 3	. 6	12	10	10	9	13	0	В	23	26	10	8	58	_18	4	24	80	102
S Key West, FL	1.3	39 6	0.6	40 2	4 5	4	3	3	3	_3	4	.0	2	· · · · · · · · · · · · · · · · · · · ·	7	2	2	18	2	1	2	21	24
S Kings Bay FSC, GA	G 98	0.9	3 3	4.2	33 7	0	1	0	1	.0	1		0	_D	1	0	D	D	.5	3	17	8	21
S Memphis, TN	0.81	9.8	10	10.8	12 5	2	- 1	4	1	4	1	0	1	3	2	3	1	16	1	1 3	6	19	13
S Mendian, MS	0.95	115	0.8	123	1.4	1	1	1.5	1	1	1	0	1	3	2	1	1	8	0.5	0	1	Θ	θ
S New Orleans, LA	0.95	39.4	0.4	39 8	4.2	3	4	3	3	3	- 4	0	2	7	8	_	3	17		.1	2	19	25
S Panama City, FL	0.92	54	0.3	57	2.9	1	. 1	1 1	0	1	1	0	0	1	1	1	0	5	0	0	2	5	
5 Pensacola, FL	0.84	36 3	20	38.3	11.6	4	4	5	£.	5	4	٥	2	7	- 6	4	3	25	2		6	28	30
S South Texas, TX	0.9	34 0	32	37.2	21 8	4	4	5	3	4	4	<u>.</u>	2	. 8	B	. 5	. 3	26	. 2	3	11	31	35
SouthDivTotal		618	49	667	176	43	54	60	46	54	57	1	34	106	114	45	38	297	40	20	91	366	434
MVV Crane, IN	101	33 5	1.0	34 5	4.5	3	3	. 2	. 3	0	. 3	.1.	2	4	. 7	15	2	20	0.5	0	2	20	22
MW Great Lakes IL	1.28	660	2.0	68 0	6.0	- 6	- 5	1	5	- 4	6	2	3	5	11	2	-4	20	0		3	20	37
EFA MidWest Total		100	3	103	11	9	9	3	7	12	9	3	6	9	18	4	6	40	1	0	6	40	59
SOUTH TOTAL		618	52	669	187	62	63	63	63	66	66	4	40	114	132	48	44	337	40	20	96	396	493
												_		- 122									
GRAND TOTAL		-		-	4000		-	240	270	~~~	337	-	202	424	675	-	225	4004	265			4075	0522
		3052	476	3528	1025	246	321	310	2/0	327	337	79	202		010	231	226				503	1975	2533
CONUS		2305 80				189		233		249		87		297		173		1208					
LANT						18		18		16		7		30		15		100			72		
PAC						10		24		20		1		33		12		100			49		
SWEST						18		25		30						14		100			73		
SOUTH						15		18		20				34		14		100			62		
SUUIM								111						34		14							

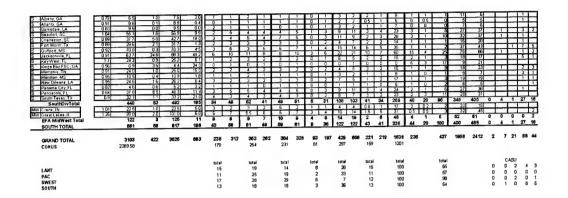
Chemy Fort  Users Company  Obel 4 (5) 2 (5) 500 100 100 4 (5) 6 (6) 7 (5) 8 (6) 5 (20) 17 (7) 8 (4) 3 (7) 47 (4) 6 (6) 7 (4) 4 (1) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Company   Comp	
C. Cherry Force C. Cherry Forc	J
Custo Creek   OS2   128   63   100   130   8   8   6   7   7   8   44   3   7   47   1   1   2   18   18   18   18   18	В
Continued   192   265   126   411   4   4   2   5   4   4   1   5   3   8   10   9   3   3   16   9   1   2   20   2   2   2   3   4   1   1   1   1   1   1   1   1   1	B
Accest   138	6
Compared Robots   Compared R	4
Column   Section   Secti	0
LANIDP'S Total	000
Record   Figure   F	9
Forthermorn	3
See PA   108   70.5   11   21.6   6.8   3.7   3.7   2.9   2.0   1   4.4   4.1   1.1   1.4   3.0   3.5   16   10   10   15   7.3   3.0   1.2   11   1.2   0.1   1.4   3.2   1.9   1.1   2.1   1.1   1.4   3.0   3.5   16   1.1   1.4   3.0   3.5   16   1.1   1.4   3.0   3.5   16   1.1   1.4   3.0   3.5   16   1.1   1.4   3.0   3.5   16   1.1   1.4   3.0   3.5   1.5   1.4   1.4   1.5	4 2
Nethanicsung   108   15   15   15   15   15   15   15   1	
Nontribuy Total   107   55 6   3 00   55 4   13 00   54 4   13 00   54 4   13 00   54 4   13 00   54 4   13 00   54 4   13 00   54 4   13 00   54 4   13 00   54 4   13 00   54 4   13 00   54 4   13 00   54 5   13 00   58 1   14 0	2
C Andrews	Û
C Earloyen  08 252 1 3 265 4 6 2 3 3 2 2 3 3 3 2 1 5 3 2 14 1 1 0 2 115 1  C Indon Nead  09 1 305 1 16 321 8 6 2 3 3 2 2 3 3 2 2 3 6 1 2 11 9 11 4 15 2  C EFACE  085 578 0 0 576 0 0 5 5 2 4 2 5 10 3 11 11 2 4 22 0 0 0 0 22 3  C Austrico  087 570 7 1 30 6611 7 5 4 5 2 4 4 5 5 10 3 1 11 3 4 18 3 3 3 2 4 3  C Outstand  087 570 3 3 6 1 2 1 1 3 4 18 3 3 3 2 4 3 3 2 2 6 6 3 2 15 12 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 3 1 1 3 1 1 1 1 3 1 1 1 1 3 1	Ü
C Indonnesed	4
C PANT Reer   DES   174   74   248   280   31   3   2   2   3   3   7   2   6   3   2   15   12   3   15   30   3   5   5   5   5   5   5   5   5   5	3
EFA Ches Total 383 870 413 102 30 40 25 34 31 42 42 25 23 84 27 26 178 38 9 53 223 30 Management     Appendix	3
Name	
Companies   192   56/4   1.5   51.8   10.0   0.5   1.4   0.5   0.3   1.10   0.9   2   0.11   54.3   3.3	4
M Feets 117 190 1 0 700 8 0 0 7 1 2 1 2 0 1 2 4 0 1 4 1 1 4 6 1 1 M South Bay 774 4 5 0 5 5 0 1 3 2 1 1 1 1 3 1 0 0 4 1 1 1 0 1 1 6 2 1 18 1 M Satran 146 6 0 10 70 2 8 1 1 1 1 1 1 0 0 3 1 1 1 0 7 1 0 1 8 1 M Carro 131 0 4 0 1 0 5 0 0 2 0 1 0 0 0 1 0 1 0 1 0 6 1 0 0 7 1 8 1 M Southernitaly 128 2 8 0 2 3 0 105 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0	5
	7
M Southern Italy 129 28 02 30 105 0 0 0 0 0 0 0 0 0 0 0 0 0 0 5 0 8 0	5
	7
EFA Med Total 220 8 228 38 21 21 16 17 23 22 9 13 43 44 17 15 129 16 10 20 163 16;	
P MCEH 1.52 74.5 0.0 74.5 0.0 2.0 5 3.0 5 8.0 6 0.0 4 6 12 3 4 22 0 0 0 0 221 3	7
P Fear Happy 147 1650 650 2300 700 60 19 260 66 130 20 30 12 27 40 10 13 67 27 9 35 123 15 P Kaholoke 1.5 0.0 40.0 40.0 0.0 0.0 6 6.0 6 70 6 0.0 4 5 12 1 4 19 0.0 0 18 3 P Manayas 168 698 160 1058 356 30 7 70 6 0.0 6 0.0 5 11 13 4 5 34 5 1 15 40 6	7
P Segapore 1:5 55 00 55 35 10 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 4 5 0 2 7 P Gega Garca 245 26 15 41 00 00 0 00 0 20 0 0 1 1 1 0 4 0 0 0 4	5
P. Debroson 2271 0.0 0.0 0.0 22 0 0.0 0.0 0.0 0.0 0.0 0.	
P Sastebs 156 74 19 92 117 10 1 20 1 10 1 00 1 3 2 2 1 8 0 0 8 1 1 1	
P Assur 165 90 16 108 111 10 1 20 1 00 1 00 1 4 2 0 1 7 0 0 5 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5
P Cammae 107 08 00 08 08 00 0 00 00 00 0 0 0 0 0 0	1
PAC Total 416 142 657 212 22 48 69 40 48 50 3 30 78 100 25 33 235 41 11 100 296 407 1 17 17 18 18 19 23 10 2 30 1 30 2 1 4 1 1 1 8 20 1 1 10 296	
SW Longuage 126 281 38 330 170 30 3 60 2 60 3 2 6 1 2 16 30 10 8 20 21 5 5 5 4 10 64 40 4 70 3 10 4 2 8 1 3 13 60 20 3 12 5 6 1 2 16 30 10 8 20 20 20 20 20 20 20 20 20 20 20 20 20	
SW El Centro 114 95 11 108 104 10 1 20 1 20 1 1 2 0 1 5 10 5 6 1 SW Meanwar 11 731 81 812 60 30 7 50 6 60 8 5 15 4 5 10 30 40 4 25 5 SW Meanwar 11 1 731 81 812 8 0 30 7 50 6 60 8 5 15 4 5 10 30 40 4 25 5 SW Meanwar 11 1 154 8 172 1871 4 9 1 12 180 10 22 0 13 8 25 5 60 20 2 2 61 7	
SW Ventura County 113 40 2 70 472 164 40 4 60 4 130 5 3 9 4 3 27 50 30 6 35 3	
SW Bandeport 12 27 27 04 05 0 0.550 0 1.00 0 0 0 1 0 0 0 1 0 3 05 0 3 SW Bandeport 11 207 33 330 100 20 3 6 0 3 20 3 2 6 2 2 12 5 50 20 3 18 2 5	
SW   Functions	
SW 39 Falms 129 313 25 338 0.8 20 3 40 2 50 3 2 6 3 2 13 10 10 0 15 11	
SWDIV otal 489 60 549 88 32 45 70 38 74 47 0 28 0 94 27 31 203 42 18 42 262 32	7
MV Everett 111 56 065 645 67 1 1 0 0 1 1 1 2 0 6 4 3 10	A
NW Faitor 119 259 076 268 559 5 2 0 1 2 10 1 10 1 10 1 10 1 10 1 10 1	
EFA NW Total 79 12 91 127 14 8 6 7 7 9 11 6 11 17 8 6 67 32 61 92 113	
OW San Francisco 1.2 2.1 51.2 52.3 0.4 10.8 3.0 6 4.0 8 1.0 5 3.18 6.5 12 0 6 12 4 10 8 10 6 5 12 0 7 12 4 10 8 10 6 5 12 0 7 12 4 10 8 10 6 5 12 0 7 12 4 10 8 10 6 5 12 0 7 12 4 10 8 10 6 5 12 0 7 12 4 10 8 10 8 10 8 10 8 10 8 10 8 10 8 10	
OW Menterry 5.17 20 0.0 2.27 6.0 1.0 2 5.0 1.5 2 0.5 2 4 0.1 10 0.3 10 10 10 10 10 10 10 10 10 10 10 10 10	Ĭ
EFACWTotal 129 65 184 9 10 19 17 16 12 20 3 12 14 39 8 13 64 0 4 64 122 5WESTTOTAL 697 127 924 223 65 72 93 60 93 76 14 45 26 151 43 50 324 74 107 418 561	



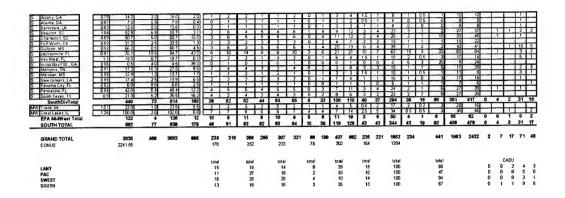
Typel Factor Typell Factor Service Factor Afe Factor Afa Factor	1 OS PAC 1. 2 \$70M 4 2 FACTOR 3	.15 .15		MII K T Q	6.3 7.5 10.0 3.0 9.0	10 %	Kem	6.0	100 %					Sep	-00
	FY01 Type I	FY81 FY81 Type II Total	FY01 Serv	M	9 L				Construction Civilian(CAS			_	S	ervice	Count Ford
Div Field Office	ACF \$M	Type II Total WIP WIP \$M \$M	WIP \$M	Total Mil	Algo	K Algo	K PM	Algo	T Algo	Q Algo	A Algo	Total Staff	к	A Algo	Grand Total Total Algo Staff Staff
L Nortok	0.92 110 0	50 1150	110	6	9	11 7	-	9	1] 6	24 19	9 6	59	61	4] 6	69 62
L NNSY L Cherry Paint	0 92 60 0 0 94 36 3	25 0 85 0 2.1 40 4	25 0 15 0	3	10	13 B 6 3	3	10	1 6	15 20 8 8	5 7	45 26	9	3 13	58 74 28 32
L Jacksonville, NC L Little Craek	0 94 110 0 0 92 16 9	2 0 112 D 3 1 20 D	15 D 3 S	- 6	8	6 7 3 2	- 5	9	5	20 17	7 8	44	3		47 80
L Oceana	0.92 69.0	100 790	12 0	3	θ	7 7	2	. 8	2 5	8 17	4 1	23	3	0 6	26 57
L Yorktown L Azores	0 92 20 0 1.34 7 0	6 1 26 1 0 0 7.0	4 3	2	3	4 2	1	3	0	6 6	3 2 1 0	16	3	1 2	20 20
L Gemo L Argenta	1 35 10 5 1,26	6.0 16.5	14.0	2	2	1 2		2	1 1	3 4	4 1	11	3	1 7	15 19
L. Panama	1 06	0.0			0	1 0		0	0	0	0	0			0 0
Iceland     Roosevelt Roads	3 36 0 1 3 100 0	4 1 40 1 3 0 103 D	24 D 26 D	3 B	9	1 2	5	9	1 6	3 5 9 16	4 2	13 30	2	3 14	16 22 38 63
New London	104 390	21 411	160 18.5	38	56 4	67 47 4 3	37	59	4 35	104 118 7 8	47 39	28/	36	14 73	336 428
N_ Brunswick	0.95 17.1	09) 180	1.7	2	2	2] 1	2	2	11 1	3 4	3 3	12	0	1 1	25 33 13 12
N North Maine N Portsmouth	0 95 6 4 1.04 17 8	03 67 08 185	0 7 5 4	2	1 2	3 1	1 2	- 1	0 0	2 1	0 0	12	0	1 0	5 4 13 13
N Earle	1.21 16.9 1.17 15.0	08 178 08 158	63 59	2	1	1 1	1	2 .	0 1	5 3	1 1	10	_1	1 3	12 12
N East PA	1 06 24 0	13 253	4 9	3	2	2 2	i	2	11 1	3 5	1 2	. 11	3	0 2	12 11, 14 17
N Mechanicsburg N Philadelphia	1 08 12 7	08 165 07 134	3 9 7.9	1 2	1	1 1	1	2	0 1	3 3	1 1	8	1	1 2	10 12 12 11
N Newport NorthDiv Total	1 D7 48 6	2 6 5 i 2 1 2 2 4	13.8	4	5 20	5 4	15	5	1 3	7 10	3 3	.22	2	2 7	26 35
C Andrews	0.95	0.0	-		0	1 0	15	0	6 13 0	39 42 0	14 14	117 0	13	10 34	140 160
C Bethesda C NDW	0 95 29 0 0 95 96 3	9.6 38.6 24.1 120.4	24 6 24 3	2	4	6 4 4 10	5	12	4 3	3 9 11 24	4 3	24 48	θ	1 13	33 39 55 84
C Dahlgren C Indian Head	0.9 25.2 0.91 30.5	13 265	4.6	2	3	3 2	2	3 .	3 2	1 5	3 2	14	1	0 2	15 18
C BRAC	0.95 57.6	00 576	0.0	5	5	2 3	2	5	10 3	2 6	1 2	22	3	0 0	15 23 22 33
C PAX River C Quantico	0 89 17 4 0 92 50 0	7.4 24.8 2.7 52.7	26 D 8 5	3	3	2 2	2	3	3 2	2 6	3 2	22 15	12	3 15	30 33
C USNA	09 571	3.0 60 1	7.5	4	6	4 5	7	6	5 4	2 12	4 4	26	3	0 4	24 35 28 41
EFA Ches Total M Aviano	363 1 33 45 0	50 413 00 450	102	30 4	40	25 34 2 3	31	42	42 25	23 84 8 8	27 29 3 3	178 21	36	9 53	223 306 21 25
M Vicenza M La Maddalena	133 73	00 450 00 73 01 03	0 0 5 0	1	1 D	1 1 0 0	1	1 D	0 0	2 1	1 0	6	0	0 0	B 4
M Sigonelia	1 32 38 9	10 399	7.4	5	4	7 3	1	4	0 0	1 D 5 7	1 B 4 2	22	0	0 3	2 3
M Rota	1 12 23 3	0.5 4.0 1.0 24.3	2 O 10 5	0	U 2	2 0	D 3	3	1 0	2 1	1 0	6 18	0	0 1	6 3
M Souda Bay M Bahrain	074 51 146 54	05 56	15	- 1	0	2 1 2 D	1	1	0 0	2 1	1 0	7	Ö	0 1	7 5
M Cairo	131 04	011 05	0.0	0	0	0 0	0	0	1 0 0 0	0 0	1) D	0	0	0 0	0 0
M OCC Naples	1 29 3 D 1 29 106 D	0.5 3.5 0.0 106.0	12 0	5	8	7 D 3 6	10	0	5 5	1 1	8 5	43	0	0 6	11 B
EFA Med Total  LANT TOTAL	238 1392	4 242 131 1523	42 363	21 111	20 136	33 17	19	21	8 13	38 42	24 14	143	0	0 22	143 149
P MCBH	1 521 94 31	00 943	9.0	20	7	136 114 3 D 5	102 8 0	7	60 96 00 4	204 286 6 14	112 96 21 5	726	<b>86</b>	33 181	842 1043 21 48
P Pearl Harbor P Kaho'olawe	147 160 0 15 0 0	65 0 225 0 50 0 50 0	65 1	9.0	_19 7	30 0 16 7 0 6	12.0	20	40 12 00 5	28 39 4 15	9 13	18	23	9 32	124 150 18 46
P Mananas	1 89 76 3	14 0 80 3	26.4	30	7	50 6	90	7	0.0 4	12 14	3 5	32	8	1 11	18 46 41 53
P Grego Garcia	15 55 245 88	00 55 00 88	3.5 0.0	10	1	10 G 00 0	10	1	00 0	0 1	0 0	3	0	0 2	5 5
P Johnston P OICC FE/Yoko	2 27 1 56 27 7	10.9 38.6		3.0	0	40 3	4.0	0	_0	0	0	0		0	0 0
P Sasebo	1 56 4 6	7 0 11 6	23 1 8 4	10	1	20 1	1.0	1	0.0 1	3 3	3 1	23 10	0	0 5	29 35 10 13
P Okinawa P Atsugi	1 85 10 0	35 296 18 118	25 D	10	1	4.0 2 2.0 1	0 0	1	DD 2	8 6	0 1	7	D D	0 12	7 12
P (wakuni P Chinhae	156 76	05 81	4.2	10	0	1.0 1 0.0 0	0.0	1	00 0	3 1 0 0	1 0 0 0	6	0	0 2	6 6
P Misawa PAC Total	1 13 06 1 64 03	01 04 163 675	0 6 0 6 178	0.0	0	10 B	0.0	0	00 0	1 D	0 0	2	Ö	0 0	2 1
SW Barstow	1 17 183	20 203	18	26 1 D	<b>60</b>	30 1 70 1	3 0	<b>62</b>	4 31	79 104	26 36	239	38 2.0	11 86	10 12
SW China Lake SW Coronado	1.26 15.5 1.1 36.4	4 0 19 5 3 2 39 6	13 B 6 7	30	2	70 1 80 3	9.0	2	1 2	4	11 1	19	3.0	1 D 6	23 18
SW El Centro	1 14 20	05 25	0.0	10	Ü.	30 0	20	0	0		05 0	7		20 3 05 4	17 26 9 5
SW Camp Pendieton	11 862	3 0 89 2 9 4 150 9	1 0 2 5	3 G 10 O	10	60 6 180 8	7 0 26 0	11	6	15 21	4 5 5 7	20 59		10 0 30 1	24 44 88 84
SW Bridgeport	1 13 28 7	110 397	8 3 0 4	0.0	4 0	6.0 3 0.50 0	13.0	4	3 D	8	4 3	29	5 0 0 5	30 4	37 29
SW San Diego	1 1 29 1	23 314 25 21 B	11 D	30	3	B 0 2	3.0	3	2	8	1 2	13	5 0	10 5	19 23
SW El Toro (closed)	1 05		5.3	20	-4-	60 2	4 0	-2	1	4	3 1	15 0	40	10 3	20 15
SW Los Angeles SW 29 Pairns	1 12 23 2 1 29 35 5	08 239 20 375	3 3 3 5	20	2	40 2 50 3	6 0 7.0	2	1	6	2 1	13 16		20 2	18 14 18 21
SW Yuma SWDIV Total	1 12 34 2	40 382 45 517	33	10	3	50 3 20 3 76 36	5 0	4	2 2 0 26	7 D 88	1 2	9 223	10	10 2	11 23
NVV Bremerton	1 16 17 92	5 9 23 72	7.6	4	2	1 2	2	2	2 1	2 5	1 2	12	12	17 33 2 4	276 297 28 18
NW Everett NW NAS Whidby Island	1 11 9 1	9 66 36 47	14 88	1 2	1 4	0 1	1	1 4	1 1	1 2 2 B	2 1	6 11	4	1	10 7
NW Fallon NW Silverdate	1 16 12 9 1 11 42 22	4 B 17 5 4 37 46 59	14 1	20	2	40 1	1.0	2	1.0 1	3 4	2 1	13	3	1 1	14 18
EFA NW Total	109	26 134	69	14	13	6 11	7	13	3 3 11 8	3 9 11 27	2 3 6 9	15 67	32	3 33	27 41 92 114
CW Concord CW San Francisco	118	17 467	0 1	10	4	30 3	4.0	4	10 2	3 6	0 3	12		1	
CW Lemoore	1 05 49 4	7.0 56.4	31	4.0	5	40 4	2.5	6	05 3	5 11	3 4	18	0	7	12 24 19 35
CW Travis	1 17 11 8 1 10 41 2	21 139 17 429	5 2 0 0	30	1	50 1 40 3	1 5	4	D 5 1 1 2	2 3 3 B	0 1 4 3	10	0	- 3	10 10 18 23
SWEST TOTAL	147	12 160	8	9	14	16 12	11	16	3 9	13 29	7 10	59	0	4	59 93
SWEST TOTAL	728	63 611	145	69	69	97 58	104	72	14 43	24 144	42 48	339	69	70	427 503

S Algang (A)								-													_			
Separation   A	5 Albany GA	0.79	6.5			2.0	1	1	2	1	1	1		1			2	1	θ	1	1	1	11	- 8
Second   S	S Atlanta, GA	0.91	8.8	0.1		0.4	0	1	1	1	1 1	. 1. /	0	1	2	2	0.5	1	5			0	- 5	- 6
State   Control   Contro	S Barksdale LA	0.03	9.5				2	1	1	_1_	0	1	0	1	3	2	-	1	7		0	0	7	- 6
S	S Beaufort, SC	1 04	55 1				2	5	4	4	4	5	1	-3	8	11	3	4			. 1	- 5		
S	5 Charleston, SC	0.69	37.7	50	427		3	4	5	4	7	5_	0	3	- 11	9	2			3		10		
Section   Proceeding   Process   P	S Fort Worth, TX	0.89					2	3		3	3	3	٥	2		7	2	2		11	1	1		20
S	S Gulfport, MS	0.92	70 0	0.3	70 3		3	6	3	5	6	7	1	4	16			5			1	2		
Section   Color   Co	5 Jacksonville, FL	0.91					6							Ĝ	22	21	10	7			4	25		
S	S Key West, FL	11	24 3				1 1	2	3	2	3	2	0	. 1	6	5	2			-	1	3		
Section   Sect	S Kings Bay FSC, GA							1	_ D	_ 1		1				- 1				- 8	3	. 17		21
Second	S Memphis, TN	0.91	24 0	10			2	2	4	_ 2	3	3	0	2	4	- 5	3	2		. 1	1	В		23
Standard City FL   1	S Mendian MS	0.95	10.5	D 4			1	1	2	1	-	1	Ď	1.	3	. 2	_1	1		1	D	1		7
Section	S New Orleans, LA						3	. 2	3	2	3	. 3		. 2	7	. 5	1	_	17	1	1	3		19
Section   Sect							1	1	1	0	1	1		0	-	_	1		5	-	G I			
SouthFloridate    SouthFlori	S Pensacola, FL							5				5		3	9	11	3	_	24	_2_		- 6		
NAID TOTAL   3103   422   3626   983   238   312   363   237   75   237   159   129   150   236   437   1966   2412	S South Texas, TX	0.9	32 1										0			7								
Wilder   176   188   1	SouthDivTotal									41			6	31				34				96		
SPAND TOTAL   100   15	MW Crane, IN	1.01				5 0		2 :		2		2	1	1				.1				2		
SOURT TOTAL   S61   66   617   196   43   68   61   49   69   61   9   36   122   122   43   41   338   44   20   100   466   486	MW Great Lakes, IL	1 26	990	2 0	101 0	60	6	7	5.5	6 1		7	3		10					0.5	0.5	3		
GRAND TOTAL 3103 422 3625 983 238 312 363 262 310 328 67 197 428 666 221 219 1638 236 437 1966 2412 CONUS 2299 59 179 253 237 75 297 159 1200  LANT 15 19 14 8 28 15 100 85 PR-C 111 25 119 25 119 2 33 11 100 57 SWEST 179 28 31 4 7 12 100 98	EFA MidWest Total		122	3	125	11	9	9	9	7	10	. 8	4	6	14	19	2	6		4	1			
GRAND TOTAL 3103 422 3626 983 238 312 363 262 310 328 67 197 428 666 221 219 1638 236 437 1966 2412 CONUS 2289 58 179 253 237 75 287 159 1200 85 LANT PAC 15 19 14 8 28 15 100 85 PAC 5MEST 17 28 31 4 7 12 100 98	SOUTH TOTAL		661	56	617	196	43	58	61	49	59	61	9	36	122	122	43	41	336	44	20_	100	400	486
CONUS 2269 58 179 253 237 75 297 159 1200  LANT 15 19 14 8 28 15 100 85 PAC 11 25 19 2 33 11 100 57 SWEST 17 28 31 4 7 12 100 98																								
CONUS 2269 58 179 253 237 75 297 159 1200  LANT 15 19 14 8 28 15 100 85 PAC 11 25 19 2 33 11 100 57 SWEST 17 28 31 4 7 12 100 98	COAND TOTAL		2402	422	2626	903	230	312	363	262	310	328	87	197	429	866	221	219	1639	235		437	1956	2412
LANT 15 19 14 8 28 15 100 85 PAC 11 25 19 2 33 11 100 57 SWEST 17 28 31 4 7 12 100 98					0010	-																		
PAC 11 25 19 2 33 11 100 57 SMEST 17 28 31 4 7 12 100 98	CONUS		2269 56				179		200		431		10		401		138		1200					
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PAC 11 25 19 2 33 11 100 57 SWEST 17 28 31 4 7 12 100 98																								
PAC 11 25 19 2 33 11 100 57 SWEST 17 28 31 4 7 12 100 98													_						400			0.5		
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12 1P 1R 3 3R 13 100 R4	SWEST						17		28		31		4		7									
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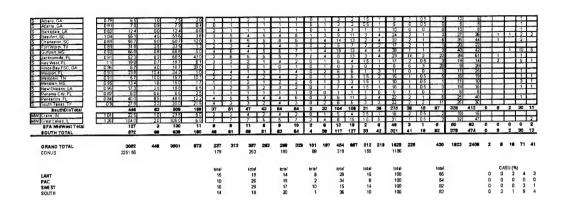
Typel Factor Typell Factor Service Factor Alc Factor	1.8 OS LAN 1 OS PAC 2 \$78M 2 FACTOR	1.15		MII K T Q	6.3 7.5 10.8 3.8 9.8	16 % 13 % 10 % 33 %	Kpm	60	17 %								Nov-00
	FYDI		FY01 FY01		AIL.				Construction Civilian/CAS				5	ervice	Grand	Total	Construction CASU
	Type	I TypeⅡ W1P	Total Serv WIP WIP	Total			T K T		CIVINSTICAS	<u> </u>		Total		_	Total	Algo	K
Div Freld Office	ACF SM	\$M	SM SM	Mil	Algo	K Algo	PM /	Algo	T Aigo	Q Algo	A Algo	Staff	к	A Algo	Staff	Staff	K PM T Q A
L Norfolk	0.92	on so	1 11501 11	0	-	111 7	В	9	1 6	24 19	91 6	59	61	41	6 69	621	7.7.1
L NNSY	0.92	00 250	850 25	Ö	10	13 B	- 8	10	1 B	15 20	5 7	45 26	θ	3 1	3 56	74	
L Cherry Pont L Dacksonville, NC	0.94	903 21 00 20	40 4 1: 112.0 1:	0	8	6 7	6	9	5	8 B 20 17	7 6	44	3		8 47	60	4 2
L Kittle Creek	0 92	0 2 0 6 9 3 1 9 0 10 0	20 0 3 79 0 1	5	2	3 2	- 1	2	2 5	6 17	4 1	17 23	1	1	2 19	57	1
L Oceana L Yorktown	0 92	20:0 6:1	26 11	3 ( )	3	4 2		3	2	6 6	3 2	16	. 3	_1	2 20	20	
L Azores	1 34	70 00 05 60	16.5	Ď	1-2-1	1 2	1 1	2	0	3 4	1 0	11	3	1	7 15	19	3
L Argents	1 26		16.5 14 0.0		8	1 0		0	0	0	0	1	$\Box$	=	0	0	
L Panama L (celand	106	60 41 00 30	40 1 24	0	2	1 2	2	2	1	3 5	4 2	13	2	1	8 16	22	2
L Roosevel Roads	13 10	00 0 3 0 578 66	103 01 26 544 11		1 B	67 47	37	E DIA	4 38	9] 16 104 118	4/ 5	30	36	34 7	3 336	428	2 0 0 10 10
Naw London	104	90 21 71 09		51	4	4 3	3	4	1 2	7 8	3 3	12	1	2	9 25	33	
N Brunswick N North Maine	0.95	64 03	671 6	7	1	1 1	1	1	0 0	2 1	0 0	4	0	1	0 5	4	
N Portemouth N Earle	1 04	176 D9	18.5 17.8	3 9	2	3 1	2	2	1 1	3 3	11 1	12	0	-1	3 13	13	<del>         </del>
N Lakehurst	1 17	50 DB	158 5	9	1	2 1	1	1	0 1	3 3	1 1	9		1	3 12	11	$\Box$
N East PA N Mechanisburg	0.94	240 13 57 08	16.5	9	2	11 1	1	2	111	3 3	11 1	6	1	1	2 10	12	
N Phiadelphra N Newport	1 00	27 07 86 26	134 7	9	1 5	2 1	1 2	5	0 1	3 2 7 10	3 3	9	3	2	7 26	35	
NorthDiv Total		213 11	224 (	9 2	20	21 17	15	21	6 13	39 42	14 14	117	13	10 3	4 140	160	0 0 1 2 2
C Bethesda	0.95	90 96	305 24	E .	2	6 4		0.4	4 3	3 9	4 3	24		3 3	3 33	39	
C INDW	096	63 241	120 4 24 26 5 4	3 -	15	4 10	-7	12	11 7	11 24	7 6	48	- 6	1 1	2 55	84 19	2 1
C Dahlgren C Indian Head	0.91	05 16	32.1	9	3	2 3	2	3	2 2	2 6	1 2	11	3	1	4 15	23	2
C PAX Ree	0.95	76 00	57.6 0 24.8 26	0	5	2 4	2	5	10 3	2 6	3 2	22 15	12	3 1	5 30	33	5 1
C Quantico	0 92	00 27 71 30	52.7 E	5	. 5	2 4		5	4 3	1 11 2 12	3 4	18	3	3	3 24 29	36	1 2
EFA Ches Total		363 50	413 10	2 30		25 34	31	42	42 25	23 84	27 26	178	36	9 5	3 223	306	0 3 11 4 4
M Avieno M Vicenza	133 4	73 00	73 C		1 4	2 3	3	4	1 2	8 8	3 3	21	0	0	21	25	1 3 1
M La Maddalena	1 37	02 01		n – c	0	0 0	Ö	0	0 0	1 0	1 0	22	Ö	0	3 2	3	
M Signelle	14	89 10 35 05	39.9 7 4.0 2 24.3 10 5.6 1	<del>i</del>	8	7 3	0	ō	1 0	2 1	1 0	6	0	0	6	3	
M Rota M Souda Bay	1 12 2 074	33 10 51 05	24 3 10	5	2	7 2	3	3	0 0	3 5	3 2	18	0	0	1 7	- 21	1
M Bahrain	1 46	54 00	5 AT 3	01	0	2 0 0 0	0	0	0 0	0 0	0 0	7	0	0	1 7	- 4	
M Southern haly	1 29	30 .05	35 12	ŭ 📑	Ü	7 0		ŏ	0 0	11 1	1 0	11	ŏ	Ö	11	ğ	
M OICC Naples  EFA Med Total	1.29	60 00			20	3 5 33 17	10	B 21	5] 5 8 13	12 15 38 42	8 5 24 14	143	0	0 2	2 143	149	0 6 2 16 7
LANT TOTAL	1	92 131	1523 36	3 111	138	138 114	102	143	001 4	204 296	112 95	725	85	33 18	1 642	1043	2 3 14 31 23
P Pearl Harbor	1 52 5 1 47 16	43 00 00 650 00 500	943 9 2250 65 500 0	D 20 1 90	19	3 0 5 30 0 16		20	40 12	28 39	9 13	92	. 23	9 3	2 124	150	
P Kaho'olawa P Mananas		6.3 14.0	500 0 903 26	00	7	70 6 50 6	90	5 .	00 5	4 15 12 14	3 5	18	- U	1 1	18	46	+
Singapore	15	55 00	55 3	5 10	ġ.	1 D D	1.0	Ö	00 0	0 1	0 0	3	2	0	5	- 5	
P Diego Garca P Dohnston	2 27	88 00	86 0	_	Ö	00 0	20	1 B	00 0	D	8	Ď	- 4	0	0 0	0	
P GICC FE/Yoko	1 56	77 109	116 0	1 10	4	20 1	10	4	00 2	9 B 3 3	3 3	10	5	0 1	1 29	35	+
P Sasebo P Okinawa	15 2	61 35	29 6 25 11 B 11	0 40	3	40 2	20	3	00 2	8 6	2 2	20	Ö	0 1	2 20	29	
P Atsugi P (wakuni	1.56	76 05	11 B 11	1 10	1	10 1	0.0	1	00 0	3 1	1 0	6		C	3 6	12 6	
P Chinhae P Misawa	164	06 00	81 4 06 0	2 10 5 00 8 00	-0	10 0	0.0	8	00 0	0 C	0 0	0 2	- 0	0 0	0 0	- 1	
PAC Total		22 163	676 17	8 25	50	60 42	45	62	4 31	79 104	25 38	238	38	11 8	287	400	0 0 0 0 1
SW China Lake	1 17 1	83 2D 55 4D	1951 13	8 30	2	70 1	30 80	2	1	4	1	19	30	10 0	6 23	18	
SW Coronado SW El Centro	114	64 32 20 05		7 30 0 10		80 3 30 0	10 20	4 0	1 2	7	1 2 05 0	13	2.0	0.5	17	26 5	+
SW Mremat	11 6	62 30	892 1	0 30	7	60 6	7.6	7	4	15	4 5	20 59	30	10	0 24	44	
SW  Camp Pendleton  SW  Ventura County		15 94 87 11.0	3971 8	3 60	10	18 0 6 6 0 3	130	4	3	21 B	4 3	29	50	30	37	84 29	40 2
SW Bridgeport SW San Diego	12	22 91 23	22 0 314 11	0 30	0	050 0 60 2	100	9	0	- 0	1 0	3 13	0.5 5.0	10	3 19	23	++++
SW Point Loma	1 1 1	91 25	21 6 5	3 20	2	6.0 2	40	2		1	3 1	15	40	10	3 20	15	
SW (Ei Toro (closed) SW (Los Angeles	1 05	32 08	239 3	3 10	2	40 2	60	2	1	1	2 1	13	30	20	2 18	14	
SW 29 Palms SW Yuma	1 29 3	55 20	37.51 3	5 20 3 10	3	50 3 20 3	7.0 50	3	2	6	2 2	16	1.0	10	2 10	21	10
SWDIV Total	-	72 46	517	9 36	42	76 30	80	्म	5 28	0 88	27 29	223 12	37	17 3	276	237	0 0 8 0 2
NW Bremerton NW Everets	111	82 59 91 09	23 72 7	4	7	1 2 0 1	1	1	2 1	1 2	2 1	6	12	4	1 10	18	
NW NAS Whidpy Island	1 15 26	81 966 29 46	36 47 14 8	1 20	4	1 3	10	4	10 1	2 B	1 3	11	4	-	15	30	
NW Siverdale	1 11 42	22 4 37	46 59	5		0 4	2	1	3 3	3 9	2 3	13	11	1 1	4 27	114	
CW Concord	1 161	09 25	134 (		13	8 11	7	13	11 8	11 27	8 9	67	32	3 3	3 92		0 0 0 0
CW San Francisco	12	50 17	457 0 564 3		4	30 3 40 4	40	A 6	10 2	3 B 5 11	0 3	12	0		12	36	
CW Lemopre CW Monterey	1 17	94 70 18 21	1391 5	2 10	1	50 1	15	1	05 1	2 3	0 1	10	ğ		2 10	10	
CW Travis		12 17		8 9	14	4 0 3 16 12	11	16	3 9	3 B	4 3 7 10	18	0		18	23 93	<del> </del>
SWEST TOTAL		28 83			89	97 58	98	72	20 43	24 144	42 48	339	60	70	427	503	0 0 8 0 2



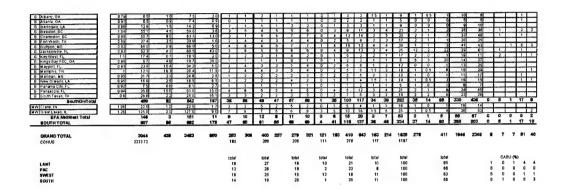
	Typel Factor Typell Factor Service Factor Alc Factor Als Factor	18 1 2 2	OS LAHT OS PAC \$70M FACTOR	1.15 1.15 4			Mill K T Q	6.3 7.5 10.0 3.0 9.0	16 % 13 % 10 % 33 %	Kpm	6.0	100 %									n-01
П			FYD1	FY01	FY01	F101	M	IL,				Construction CA				. Se	vice	Grand	Total	Cons	ruction ASU
D₩ F	ield Office	ACF	Type† WIP \$M	Type II WIP SM	Total WIP SM	Serv WIP \$M	Total MI	Algo	K Algo	PM	Algo	T Algo	Q Algo	A Algo	Total Staff	ĸ	Algo	Total Staff	Algo Staff	K PM	TQA
L N	torfolk INSY	093		5 0 25 0	115 0 85 0	11 0 25 0	6 3	9	11 7 13 8		9 8 10	1 6	24 19 15 20	9 6	\$9 45	6 B	3 1	69 56	74		1 1
£ 0	herry Point acksonville, NC	09	363	21	40 4 112 0	25 0 15 0 15 0 3 5 12 0	1	4	6 3		4	2 5	8 6 20 17	5 3	26	2		28 47	32 60		4 2
L U	atie Creek	093	16.9	31	20 0 79 D	35	1	2	3 2		1 2	2 5	B 4 B 17	1 6	17	1	1	19	15 57		
L Y	orktown	093	200	61	26 1 7.0	43	Ž	3	4 2		3	2	6 6 1	3 2 1 D	23 16	3	1	20	20		$\blacksquare$
L G	zores emo	134	10.5	0.0	16.5	140	- 2	2	1 2		2	1	3 4	4 1	11	3	1	15	19		3
L P	rg entre	1.06			0.0 0.0 40 1		$\vdash$	0	0		Ö	0	0	0	0			ō	, o		
1.0	reland roosevelt Roads	1	36 0 100 0 678	41 30	103 0	24 D 26 D	3	8	1 2		2 2 5 B	5	3 5 9 15 104 118	4 2	13 30	5	3 1		63		0 10 10
	LANTOPS Total	3,04	39.0		644 41 1	18.5	38	4	41 3		569	4 30	104 118 7 8	3 3	287	36	21 5	338 25	<b>428</b>	2 0	0 10 10
N B	runswick orth Maine	09	39 0 17 1	0.9	180	17	1	- 2	2 1		2 2	0 0	3 4	0 0	12	0	1 (	13	12		1
N P	erismouth arte	104	17.6	09	18 5 17 8	5.4 6.3	2	2	3 1	-	2 2	0 1	3 3	11 1	12	0	1 3	13	13		$\Box$
N C	akehurst	117	150	0.8	158	59 49			3 1			0 1	3 3	11 1	9	2	1	12	- 17		
N M	est PA fechanicsburg	0.94	15.7	8.0	253 165	39	1	2	1 1		2	1 1	3 3	#	А	Ĭ	1 7	10			1
N P	hitadelphia lewport	100	12.7 48.6		13.4 51.2	7 9 13 B		5	5 4		2 5	0 1	7 10	3 3	ğ 22	2	2 1	12 26	35		
	NorthDiv Total	099	213	11	224	86	22	20	21 17	10	0 21	<b>6</b> 13	39 42 0	14 14		13	10 34		160	0 0	1 2 2
C 18	ethesda DW	099	290	9 E	38 6 120 4	24 S	7	4	5 4 4 10		12	4 3	3 9	4 3	48	6	1 1	55	39 84	1 1	
C., D	ahigren	0.9	25.2	13	26.5	46	- 2	3	3 2		3	3 2	1 5	3 2	14	1	0	15	19		3 1
C 18	idian Head IRAC	091	30.5 57.6	0.0	57.6	0.0	5	5	2 4		5	10 3	1 11	2 4	22 15	Ö	0 0	22	33		5
c o	AX Rwar Juantico	089	17.4 50.0	7 A 27	24 B 52 7	28 0 6 5	3	. 5	2 2 2 4 4 5		5	3 2	2 6	3 2	18	3	3 1	24	36		1 2
C IU	EFA Ches Total	0.93	57 1 363	30	60 1 413	102	30	. E	26 34	31	6 42	5 4 42 25	23 84	27 28	26 178	36	8 63	29 223	306		11 4 4
MA	wiano	133	45.0	0.0	45 D	0.0	4	4	2 3		4	1 2	8 6	3 3 1 D	21 6	0	0 0	21	25		1 3 1
M L	icenza a Maddalena	1 37	0.2	01	03 399	50	0	0	0 0		0	0 0	1 0	1 0	2 22	ğ	Ö	22	3	$\Rightarrow$	
M L	andon	13	38.9 3.5	0.5	4.0	20	- 0	<b>4</b>	7 3	- 7	0 0	0 2	2 1	1 0	6 18	0	0 1	6	3		##
	ora ouda Bay	074	51	05	24 3 5 6	20 105 15	1	1	7 2		3 3	0 0	3 5	3 2	7	0	0 1	18	5		1
	ahrain airo	1.46	54	00	5.4 0.5	30 00 120	- 1	. 0	2 0	{	0 0	1 0	0 0	0 0	7	0	0 1	7	4 0		11 1
M 5	outhern Italy ICC Napres	125	30	0.5	3.5 106.0	120	- 2	0	7 0	- 10	0	0 0	12 16	1 0 B 5	43	0	0 6	43	49	$\Box$	1 9 5
- IO	<b>EFA Med Total</b>		238	4	242	42	21	20 138	23 17 136 114	15	21	8 13 80 86	38 42 204 286	24 14 112 96	143	95	0 22 33 181	143 842	149 1043		2 15 7 14 31 23
PW	CBH	152	1392 619	131	1623 619	363	20	5	40 4	9.0	5	0.0 3	81 10	2 3	24	9	0 1	24	36	ΠŤ	
	earl Herbor aho'olawe	1.47	0.0	65 0 50 0	225 D 50 D	65 1 0 0	11.0	19	33 D 16 7 D 6	140	8	00 5	30 39 3 15	11 5	99 17	0	0 0	12B	150 46		
P M	farianas ingapore	1.99	819	14.1	96 D	50 B	30	7	50 6 10 0	90		00 4	12 14 0 1	3 5	32 3	2	0 2	41	66 5		
b. 10	liego Garçia hailand	108	12.8	00	12 B	0.0	0.0		10 0	20	1	00 0	0 1	1 1	4	0	0 0	4	6		+
P 0	ICC FE/Yoko	1.56	277	109	386	231	3.0	4	40 3	30		00 2	9 8	3 3	15	5	1 11	2B	35 13		
P 0	iasebo ikinawa	1.56	24 6	7 D	29 D	28 0 11 3	40	3	50 2 20 1	20	3	0.0 2	8 6 4 2	2 2	21	0	0 14	21	31		$\Box$
	dendi Makhu	1.65	66	1 8 0 5	73	42	10	1	10 0	0.0	3 3	00 0	3 1	1 0	6	0	Ö	Б	- 12		
	hinhae fisewa	1.07	10	0.0	1 D D 4	0.2 0.8	0.0	0	00 0 10 0	00	0 0	00 0	D D	D D	2	. 0	0	2	1		
	AC Total	110	402	154	666 23.4	295	27	49	66 41 30 2	30	1 2	4 31	82 103	24 34	249 8	20	6 96	296	408 14	0 0	<del>* 1 1</del>
SW C	hma Lake	126	16 9	30 43	19 9 42 D	135	30	2	60 1 60 3	70	2	1 2	4 B	2 1	18	20	1.0 € 2.0 3	21	17		1
SW E	oronado_ I Centro	1.14	7.2	07	7.9	91	10	. 1	20 1	20	1.1	0	11	05 0	6	10	10 6	7	9		
SW C	amp Pendiston	11	1385	227 124 110	45 1 150 9	10 25 83	30 90	5 _10	60 4 180 9	21 0	11	00 7 2	5 Z2	7 7	20 60 26	6.0	20 1	68	67		5 2
	rentura County	11	25.2	110	36.2 2.1	0.4	0.0	4 0	0.50 0	1.00	0	. 0	0	1 0	3	0.5	10 4	33 18	1		
SW S	on Diego	116	23 7	23 25	31.4 26.2	11 Q 6 1	30 20	2	60 2 60 2	40	3	1	5	3 2	12		10 3	20	17		
SW E	iTero (closed) os Angeles	10:		0.6	18.2	33	10	2	4D 1	60		- 1	3	2 1	13	30	20 2	18	11		
		125	47.0	201	49.0	40	20	4	4 G 3	5 C	4	2	11 8	2 3	14		10	16	26 23		1 2
24/ [	9 Palms fuma SWDIV Total		423	68	23 72	71	32	42	71 3	7	44	0 26	8 87	31 25	219 12		16 3	269	23 297	0 0	0 8 8
NW E	verell	116	9 1	6 9 6 0 6 0 6 0	10	7 6 2 4 14 90		1	0 1		1 1	1 1	1 2 2	2 1	6 11	-4		10	- 7		
NW F	AS Whidely Island	1 16	129	4.5	36 47 17.5	141	20	2	40 1	- 10	2	10 1	3 4	2 1	11 13 15	1		14	18		
NW S	FFA NW Total	3.1	42.22	4 37	45 59 134	30 59	14	13	6 1		7 13	3 3	3 9 11 27	8 8	15	32	3 33		114		0 0 0
	oncord	116		17	467	01	10		30 3	40		10 2	3 B	0 3	12	0		12	24	$\Box$	-
CW L	emoore	105	49 4	70	56.4	31	4 D	5.	4.0 4	25	5 6	05 3	5 11	3 4	19	ŏ		12 19	36	$\Box$	777
CW N	ravis	110	41.2	17	429	52	3.0	4	40 3	3.0	0 4	10 2	3 8	4 3	18	Ö		16	23		
5	EFA CW Total		147 679	13 106	180 785	8 148	. 55 	14	16 12 83 57	1		3 B	13 29 32 144	7 10	335	67	70		503		0 8 8



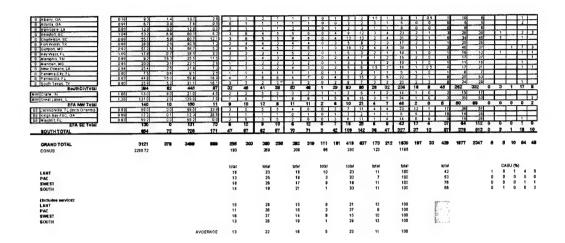
Typel Factor Typell Factor Service Factor Als Factor Als Factor	1.8 OS LANT 1.15 1 OS PAC 1.15 2 870M 4 2 FACTOR 3	MH 6 K 7. T 10 Q 3 A 9	D 10 % D 33 %	6.0 <u>17</u> % 100 %			Jul-01
	FY01 FY01 FY01 FY01 Type I Type II Total Serv	MIL	<b></b>	Construction Construction		Service	Grand Total CASU
Dev Field Office	ACF \$M \$M \$M \$M	Total Mil Algo	K Algo FM	Algo T Algo	O Algo A Algo Staff	K A Algo	Total Algo K FM T Q A
L Norfels L NNSY	092 1100 50 1150 11 092 600 250 850 25	0 6 9 0 3 10	13 8	6 10 1 6	151 20 5 7 45	8 3 13	69 52 56 74 1
L Jacksowile NC	0.92 60.0 25.0 65.0 25 0.94 50.3 21 40.4 15 0.94 110.0 20 112.0 15 0.92 16.9 3.1 20.0 3	0 4 4 0 6 B	6 3	3 4 2 5 9 5	20 17 7 6 44	3 6	26 32 1 47 60 4 2
L Cotana	0.921 69.01 10.01 79.01 12	OF 3 B	3 2	2 8 2 5	8 4 4 1 17 8 17 1 6 23 6 6 3 2 16	3 0 6	26 57 1
L Azores	092 200 61 261 4 134 70 00 70 0	0 1		1 1 0	1 1 0 2 3 4 4 1 11	3 1 9	2 4 15 19 3
L Gémo L Argenta	135 105 60 165 14 126 00 106 00	0	1 0	0 0	0 0 0	1 6	
L Sceland		0 3 2	1 2	2 2 3	3 5 4 2 13	Z 1 1	16 22 2
LANTOPS Total	13 1000 30 1030 26 578 88 644 10	36 6	67 47 3	7 59 4 35	104 118 4/ 39 28	36 14 73	
N New London N Brunswick	1 04 39 0 21 41 1 18 0 95 17 1 09 18 0	7 2 2	4 3	3 4 1 2	3 4 2 1 12	0 1 1	13 12 1
N North Maine N Portsmouth	0.95 6.4 0.3 6.7 0 1.04 17.6 0.9 18.5 5		3 1	1 1 0 0	3 3 1 1 1 12	0 1 3	13 13
N Earls N Lakehurst	1 21 16 9 D9 17 8 6 1 17 15 0 D8 15 8 5	9 2 1	1 1	1 2 0 1	3 3 1 1 9	1 1 3	12 12 11 12 14 14 14 14 14 14 14 14 14 14 14 14 14
N East PA N Mechanicsburg	106 240 13 253 4 094 157 08 165 3	9 3 2	1 1	1 2 1 1	3 5 1 2 11 3 3 1 1 8	3 0 2 1 1 2	10 12 1
N Philadelphia N Newport	094 157 08 165 3 108 127 07 134 7 107 486 26 512 13	8 4 5	5 4	1 1 0 1	3 2 1 1 9 7 10 3 3 2	3 0 4	12 11 26 35 2
NerthDiv Tetal	213 11 224	22 2	0 21 17 1	0 0	39 42 14 14 117 0 0 0 3 9 4 3 24	13 10 34	140 160 0 0 1 2 2
C Bethesda C NDW	0.95 29.0 9.6 38.6 24	6 2 4	6 4 4 10	0 0 6 4 4 3 7 12 11 7	111 24 7 8 46	6 1 13 6 1 12	33 39 1 55 64 2 1
C Dahigren C Indian Head	091 252 13 265	6 2 3	3 2	2 3 3 2 2 3 2 2	1 5 3 2 14 2 6 1 2 11	1 0 2	15 19 3 1
C BRAC C PAX Boar	0.961 57.61 0.01 57.61	5 5	2 4	2 5 10 3	1 11 2 4 22 2 6 3 2 15	0 0 0	22 33 5
C Quenico	0.89 17.4 7.4 24.8 28 0.97 50.0 27 527 6 0.9 57.1 3.0 60.1 7	4 5	2 4	2 3 3 2 4 5 4 3	1 11 3 4 18 2 12 4 4 26	3 3 3 3 0 4	24 36 1 2 29 41 3
EFA Ches Total	363 60 413 10	2 30 4		1 42 42 25	23 84 27 28 178	36 9 63	223 506 0 3 11 4 4
M Vicenza	133 73 00 73 0	1 1	1 1	1 1 0 0	2 1 1 0 6	0 0 0	6 4
M La Maddalena M Sigonella	137 399 10 399 7	4 5 4	71 3	1 4 0 2	5 7 4 2 22	0 0 4	22 26
M Rota	14 35 05 40 2 112 233 10 243 10	0 0 0 5 2 2	2 0 7 2	0 0 1 0 3 3 0 2	2 1 1 0 6 3 5 3 2 18 2 1 1 0 7	0 0 6	18 21 1
M Souda Bay M Bahrain	074 51 05 56 1 146 54 00 54 3	0 1 0	2 0	0 0 0	2 1 1 0 7	0 0 1	7 4 11
M Cairo M Southern Italy	1.31 0.4 0.1 0.5 0 1.29 3.0 0.5 3.5 12 1.29 106.0 0.0 106.0 0	0 0 0	7 0	0 0 0 0	0 0 0 0 0	0 0 6	11 B 1 9 5
M OICC Naples  EFA Med Total	238 4 242 4	2 21 2			12 16 8 5 43 38 42 24 14 143	0 0 22	143 149 0 0 2 15 7
P MCBH	1392 131 1823 34 152 619 00 619 8 147/ 17624 550 2312 41		50 4 9	0 5 00 3	204 288 112 96 725 6 10 2 3 26	96 33 181 0 0 4	842 1043 2 3 14 31 23 26 36 1
P Pearl Harbor P Kahoʻolawe	15 00 500 500 0	0 0 7	32 0 15 13 7 0 6 6	00 5	30 37 6 12 93 5 15 1 5 19	0 0 0	123 133 19 46
P Marenas P Singapora	199 819 141 960 50	10 0	50 6 10 10 0 1 00 0 2	0 1 00 0	12 14 3 5 33 0 1 0 0 3	9 1 22 2 0 2	42 65 5 5
P Diego Garcia	246 70 00 70 0	0.00	00 0 2 10 0 0	0 00 0	0 1 1 0 3	0 0 0	3 3
P OICC FE/Yoke P Sesebo	100 20 01 21 0 155 277 109 385 23 156 46 70 116 9	10 1	30 3 2 10 1 2	0 4 00 2	9 6 1 3 16	5 1 11	24 35
P Okrnawa	15 255 55 310 26 165 90 18 108 11 156 66 05 7.1 4		50 2 2 20 1 0	0 3 0.0 2	8 6 2 2 20	0 0 14	20 32
P Arsuqi P (wakuni P Chinhae	156 66 05 71 4 107 10 00 10 0	2 10 1	10 0 0	0 1 00 0	3 1 1 0 6	0 0 2	6 6
P Misawa	164 03 01 04 0	00 0	10 0 0	0 00 0	1 0 0 0 0 2 80 100 20 33 242	0 0 0 0	289 388 0 0 0 1 0
SW Barstow		0 10 2	30 2 1 60 1 3	1 2 10 1	05 4 1 1 8 15 4 2 1 17	20 1 20 10 6	10 14 1 20 17 1
SW China Lake SW Coronado	1 16 37 7 43 42 0 6	30 4	80 3 2	0 4 10 2 1	1 6 3 3 18 05 1 05 0 6	20 10 3 10 05 4	21 26
SW El Centro SW Miramar	111 224 227 451 1	0 30 5	20 1 1 80 4 4 170 9 10	0 6 15 3	15 11 4 4 22 10 22 7 7 58	10 05 4 10 10 0	24 34 5 3 66 67 5 3
SW Camp Fundation SW Ventura County	1 12 26 2 110 36 2 8	3 40 4	80 3 6	0 4 30 2	3 8 5 3 29	20 20 4	33 26
SW Bridgeport SW San Diego	12 21 21 21 0	4 D0 0 30 3 1 20 2	050 0 10 60 2 1	0 3 06 2	0 1 0 3 06 6 1 2 12 1 5 2 2 16	05 0 30 20 5 20 10 3	17 22
SW [Peint Lome SW [El Toro (closed)	116 237 25 262 6	20 2	80 2 2		0		0 0
SW Log Angeles SW 29 Palms	1 12 17 6 06 18 2 3 1 29 47 0 20 49 0 4		40 1 3	0 4 10 2	15 3 3 1 14 3 8 1 3 13	20 10 2 10 10 2	17 11 15 26 2
SW Yuma EWOIV Total	1 12 34 2 40 38 2 3	33 42	20 3 2 77 38 3	44 19 26	2 7 1 2 9 26 87 32 29 224	10 10 2 26 14 33	11 23 2 263 297 0 0 0 9 8
NW Everett	116 17.82 59 23.72 7 111 91 09 10 2	4 1 1	1 2	2 2 1	2 5 11 2 12 1 2 2 1 6	12 2 4 4 1	26 16 10 7
NW NAS Whidby Island NW Fallon	1 15 26 81 9 66 36 47 14 1 1 16 12 9 46 17 5 14	1 20 1 2	1 3	1 4 4 2 0 2 1D 1	2 8 11 3 11 3 4 2 1 13 3 9 2 3 15	4 7	15 30 14 16
NW Swerdale EFA NW Total	1 11 42 22 4 37 46 59 100 25 134		0 A 8 11	7 15 11 8	3 9 2 3 15 11 27 8 6 67	11 1 14 32 3 33	27 41 82 114 0 0 0 0 0
CW Concord CW San Francisco	115		1 3 1 4		3 B 0 3 12	0 0	12 24
CW Lemeore	105 494 7.0 564 3		40 4 2 50 1 1	5 6 05 3	5 11 3 4 19	0 2	19 35
CW Monterey CW Travis	118 412 17 429 0	30 4	40 3 3 16 12 1	0 4 10 2	2 3 0 1 10 3 8 4 3 18 13 29 7 10 59	0 0	18 23 0 0 0 0
EFA CW Total SWEST TOTAL	147 13 160 678 106 785 14		16 12 1 30 57 5		80 144 47 48 346		414 800 0 0 0 8 8



Type of Factor Type of Factor Service Factor Afte Factor Afte Factor	1.8	\$7	S LAMT S PAC TON ACTOR	1.15 1.15 4			MB K T Q	6.3 7.5 10.0 3.0	13 %	Kpm	4.0	100	:	£		need to v	₩Ty							Jan-	)2	
	Ī	$\neg$	FY02	£405	FY02 Total	FYE2 Serv		AIL.				Cons	ove AS					S	ervice	-	Grand	Total		Constuc	ion	
		- 1	Type I WAP	Type #	WIP	WEP	Total	-		К	Г			ΪТ			Total		$\Box$		Total	Algo		K	O A	
Div Field Office	A	CF	Ħ	SM	ŞM	ţN.	MI	Algo	K At	o PM	Algo	끄	Algo	۰	Algo	A Aic	o Staff	К	<u> </u>	Aigo	Staff	Staff	KI	M T	LGIA	
L Sawaiis Point (Norfolk)		0 92	1130	71	120 1 60 5	11 0 28 0		9	12 9 14 6	1	4 10 3 8	4	5	16	20 16	4 7	57	6 7	0	14	63 59	85	-,-		2 1	
L INNSY L Cherry Point		0.94	41.3	0.0	41 3 115 D	12 D		4	6 3		4 4		2	12	0	2 3	24	3		8	29	30 84	7		2 2	
L Usecksgradie, NC L Little Creek		0 94	111 0 26 2 56 4	40 00 75	26 2 63 9	4.1		2	3 2		3 3		2	- 4	5	- 1 2	12	7		2	19	.17	1	=		
L (Corana L Pennisula (Yorkfown)	- F	0 92	36 4 20 6	0.01	21 5 10 0	5 4	H	6	6 5		2 2	- 1	4	4	13	0 1		3	1	3	15	43 15	1			
L Azores		1 29	10 0 13 8	18	10 0 15 6	12 8		1	3 1	-	2 2		1		3	1 1	8	3	-	7	11	16	$\pm$	_	3	
L Panama					0.0	0.0		0	1 0		0	-	0		0	0	1 0	$\Box$	$\dashv$	0	0	0	Ŧ	=	=	
L sceland		2 59	38.5	41	42 6 59 9	16.5	=	3	3 2		1 3		2		3	1 2	9	3	-	- 6	12	23	7		3 2	
L Roosevel Roads		1 38	54 5 669	38	594	22 0 136	4	81	65	3 8	83	12	32	78		16 3	5 265	80	4	67	315	387 27	5	0 1	10 12	
N Brunswick		1.17	34 6	1.8	36 4	14 3		3	31-7			-4	.2_			+ +		- "			49		-			
N North Mane (Brunswick) N (Portsmouth		1 07	30 3 24 1	1.5	31 B	2.6		3 2	3 2	-	3 3	3	2	0	5	3 2	13	1 6	0	1	19	19	$\pm$		2	
N New Jersey (Earle/Lakehurst)		1 22	36 6 50 0	17 0 B	38 3 50 8	101		3	5 3	_	3 3	4	3	5	7.	3 3	26 25	× 6	0	5	35	25 31	1	-		
N East PA N Mechanic sourg		0 64	11.2	0.6	12 0	1.0		1	2 1	=	1	-1	1	. 0	2 2	1 1		3	0	1	12	11	1	1 0		
N Philadelphia N Newport		1 08	127 498	26	13 4 51 2	7 9 13 8		4	5 4		5	Ť	3		0	3 3		- 2	- 2	- 7	26	35	#		- 2	
NorthDiv Total			248	12	260	61	26	23	30	9 2	2 24	18	14	24	-	21 1	6 143	36	2	29	181	173	3	1 1	2 2	
C Andrews C (Bathesda)		0 96	20 5	74	23 0	24 D		0 2	6 2	-	3 2	4	1		5	1 2	18	O O	0	12	18	25	+	+		
C INDW (nr. BRAC)		0.96 0.91	652	13.0	78.2	21.3		i.	11 7		8	.10	5	- 8	17	7 6		- 6	1	11	49	. 51 19	+	1 2	$\Box$	
C (Indian Head		0.96	25 3 20 5	20 06	28.3 21.2	5.8		2	4 2		2 2	2	1 2	2	7	1 1		15	.0	3	21 44	15	#	1	1	
C PAX RNW C Quantico		0.94	36 4 40 4	2 2	36 6 40 4	25 P 8 5		4	5 3		3 4	. 8	2	Ď	В	2 3	21	8	ő	4	29	28	#	_		
C BRAC	$\vdash$	0.9	628	0.0	62.8	0.9		6	8 5		6	4	4	3	12"	3 4		3	9	0	37	37	$\pm$		3 3	
EFA Ches Total		- 411	272	20	292 51.0	89	26	2	21 4		29	36	18	12	.00	12 1	9 164	45	1	45	210	221	÷	1 3	3 11	
M AVERD		32	51 0 3 7	0.0	37	13		ò	1 0		0 0	Ö	0		1	1 0	5	Ŏ	ŏ	1	5	3	#			
M Le Maddalena M Sigonelia		1 29	0 7 54 2	0.0	0 7 54 2	63		5	1 0		5	0	3	5	11	4 4	22	0	ő	3	22	36	#	$\Rightarrow$	$\Box$	
M Rote	-	12	25 0 5 1	0.0	3 5 25 0	90	7	2	2 0 8 2		3 2	0	0		5	2 2	19	0	. 0	- 1	19	19	$\pm$			
M Soute Bay		31	51	0.5	5 6 5 4	15		0	7 0 7 0 7 2		1 1	0	0		1	1 0		0	0	1	6	6	+		1 1	
M Southern Italy M OICC Naples		12	20 1 96 8	05	20 6 96 9	3 0 11 3 1 9		2	7 2		0 2	0	1 5	1		5 5		0	8	- 5	11 28	18	+	+	6 1	
M C siro		-1	265	2	200	40	19	23	34			-	16	34		20 1	6 128	Ť	Ţ	22	128	169	Ţ	-	14 3	
EFA Med Total LANT TOTAL			1344	70	1414	325	111	124	188 10	110	131	71	78	148	281		701		7	163	838	945	i	2 .		
P MCBH P Pain Harbor		1 57	109 4 176 2	0 0 55 0	109 4 231 2	8 E	10	7	5 6 30 14	. 13	19	50		30	14 36	5 12		23	4	20	120	128	土			
P Managas		15	0 0 54 6	46.5 29.7	45 5 84 3	3 5 33 7	0	7	7 6		7	0.0	5	14	14	1 5	18	11	2	14	16	45 80	+	-	H	
P Sengapore P Deego Garcia		113	95	0.0	0.0	4 5 25 0	1	D	1 0	,	0	0.0	0	0	0	0 0	3	2	0	10	5	2	$\mp$			
P Theiand		13	2 7 26 6	01	2.3	0.4	1	0_	1 0	1	Ů.	00	0	0	0	1 0		0	0	0	4	- 2	_	$\perp$	$\Box$	
P DICC FEMORO P Sesebo		197	4.6	160	44 6 11 6	23 0 9 4	1	1	7 3	1	1	0.0	1	. 3	3	2 1	- 8	1	- 1	4	10	12	#			
P Oknowa P Atsuga		194	25.5 9.0	5.5	31 Q 10 8	28 0 10 0	1	1	6 2 2 1	0	3	0.0	1_	4	2	0 1	21	0	Ü	14	21	28 10	+			
P Chinhse		1 85	7 2	0.5	10	6 2	0	1 0	1 0 0 0		0	0.0	0_0		0	0 0	6	. 0	0	0	0	6	1			
P Misawa		1 98	30	184	3 2	194	32	0	1 0		61	0.0	30	11		0 0 22 3	4 262	48	0	0	319	391	<u>.</u>	0 0		
PAC Total SW Rivstow		117	14 9	4.9	198	2.2	1.0	2	30 2	1	2	0.5	1	1 5	4	11		20	-		10	13	Ť	Ť		
SW China Lake SW Coronado		13	13.5 37.6	3.0 6.3	16.5 43.9	11 8 6 8	3 Ú 4 Ú	1 4	60 3	11	0 4	0.5	.2	1 5	3 8	7 3	15	20	20	3	19	28	+	_		
SW El Centro		1 19	33 8 118 1	30.0	9 6 63 6 126 8	8 2 3 0	3.0	1	20 1 80 8		0 7	1 0	1		15	2 5	19	10	1.0	- 1	21	46	$\pm$			
SW Camp Pendieton BW Ventura County		112	118 1	107	126 8	10.8	100	9	160 7	- 4	5	30	3		19	3 3	24	20	20	2	62 28	58 34	$\pm$		2 )	
SW Bridgeport		1 35	33 1 17	0.5	49.9	10 8 0 4 9 t	30	0	50 4 050 0 70 4			10	0		9	2 3	17	2 0 .0 5	1.0	0	21	32	-	-	$\Box$	
SW San Diego SW Porti Loma		12	43 9 23 5	8 Q 2 S	26 0	8.0	2.0	2	8.0 2	2	2	10	1	-1	5.	2 2	14 D	2.0	1 D	-4	17	18	+	=		
EW E) Toro (closed)  BW Los Angeles		112	20 3	. 00	204	31	10	2	50 1				1		1	1 1	14	10	10	-2	16	12	+	_		
SW 29 Pams SW Yuma		1.35	49.5 24.8 419	0.6 4.0	50 1 28 6 803	3.5	20	3 44	4.0 3 30 2 70 37		3	10	2 21	31	5	1 3	11 210	1.0 1.0 25	1.0	2	15 13 247	18	1	土		
NW Bremerton		1 16[	17 82	5.9	23 72	74	30	. 2	10 37		21 2		1	21	5	1 2	12	12	13	- 4	247 26 10	310	Ť	i e		
NW Everett		1 11	9.1	9 66	36.47	14 86	1	1	1 3	+	1	1	1 2		7	2 1	11	4	T	- 5	15	7 29	Ŧ	F		
NW NAS Whigby Island NW Fallon		1.2	12.9	4 8	17.5	141	20	2	40 5	10	2 4	10	1	3	4 9	2 1	13	11	-	-,7	34	17	+	=	$\blacksquare$	
Severdale EFA NW Total		1.14	42 22 108	28	134	30 69	14	12			13	11	. 8	11	28		8 57	32	3	30	82	111	0	0 0	0 0	
CW Concord CW San Francisco	F	12	44.5	0.0	445	01	1.0	4	30 3	0	0 4	6.0	2		7	1 2	14	0		0	14	23	+			
CW Lamoore CW Monterey		1 25	49 0 11 6	82	57 2 13 8	5 0 5 6	20	5	15 4 10 1 20 2	1	5 0	10	3		3	0 1	7	1.5	3	3	22	34	$\pm$	$\pm$		
CW fravis		74	30 9	0.0	30.9	0.0	11	12	20 2	- 2	3	50	2	16	3	2 2	20	0	$\neg$	0	20	15	J	0 0		
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L Sawells Pont (Norfolk) L NNSY	094	113.0	7 S	120 1 80 5	11.0	5	9		6	10 10	3 8	13 15	2 5	43	9	18	54	82	1	1 3
L Cherry Point	0.94	41 3 111 D	40	41 3 115 0	120	5	4		3 7	8 8	5 5	8 8 12 18	1 3		7	6	30	30 64	2	2 2
L Lifthe Creek	0 94	26 2	0 0 7 5	26 2 63 9	4.1	3	2		2	3 3	5 2	4 5	1 . 7	14	2	1	18	17	î	1 1
L Pennsu's (Yorkfown)	094	26 2 56 4	7.5	21.5	5.6	4	- 6		5	2 2	0 1	7 13	2 4		2	3	26	43	1	++
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L Panama				0.0	0.0		0		0	2 3	0	2 5	5 2	0		9	. 0	22		
L Roosevel Roads	2 65	38 5 54 5	41	42 6 58 9	16 5 22 0	+	5	31	4	5 6	1 3	9 11	4 4	29	3	11	37	45		3 3
LANTOPS Total	131	559	10	37.3	138	43	- 80	48	3	40 50	14 32	5 7	34 :	19	48 10	67	326	385 28	8 0	0 8 18
N New London N Brunswick	-	36 3			16.0					1	1					Ľ				
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N New Jersey (Earlest akehurst)	1.21	34.0	1 7 D 3	35 7 36 7	9.6	5	3	3	2	1 3	2 2	9 6	4 2	24	4	1	26	23	1	1
N East PA N Mechanic sture	0 9 3	36.4	0.8	5 3	21	1	3	- 1	0	2 1	1 0	. 11. 1	1 0	7	1	1	8	5		
N Philadelphia		-		0.0	10.0		0		0	2 6	1 2	6 7	1 2	0		0 6	22	27	1	1 1
N Newport N Lakehurgt	1 09	34 2	4 D	38 2			J							_	1	Ľ			1	
NorthEast Total		196	- 11	206	67	22	18	25	16	19 19	11	36 38	14 1	0 122	• •	29	135	142	0 1	0 6 3
C Andrews C Bethesda	0.98	20 0	0.0	20 0	16 D	2	2	9	Ť	4 2	4 1	0 4	1 1	20		8	20	19		1 1
C. INDW (Inc. BRAC)	0.98	71.5	16.0	87.6	21.5 3.1 5.8	9	9	10	7	6 9	10 5	5 19 0 5	1 6	16		- 11	18	67 18	- 0	3 1
C Contigren C (indian Head	0.88	20.6	2 0 0 0	26 9 20 6	5.8	2	- 2		2	2 2	2 1	2 4	0 1	12		3	12	_151	$\bot$	1 0
C PAX River C Quantico	0 98	36 4	0.0	37 9 38 5	75 B	4	3	14	3	3 4	6 2 7 2	0 7	2 2	29	-	13	29	33 26	++	1 2
C UBNA	0.58	61.0	0.0	61.0	12 2	4	5	7	5	6 5	1 3	0 11	3 4	27		- 6	27	40		0 3
C BRAC EFA Ches Total		273	19	292	94	29	27	63	23	25 29	41 17	8 57	13 1	9 170	- 6	47	170	219	0 0	7 0 12
M Avano	1.4	510	0.0	51.0	0.0	- 4	4		•	3 5	1 3 0 0	7 9	3 3	2D 5		0	20	27		1 3 1
M V E enza	1.28	0.4	0.0	0.4	13	0	0	- 2	0	1 0	0 0	1 0	0 0	1.4.		2	4	3		
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M Role	. 1 2	25 0	0.0	25 0 5 6	8 C	2	2	8	2	3 7	0 1	5 5	2 2	20		5	20	19		2
M Souda Bay	1 23	51	0.5	5 6 8 0	5.5	- 1	1	3	0	0 1	0 0	2 1	11 0			1 3	8)		+	11 1
M Southern Haly	1.2	20 1	0.5	20 6	11 3	3	2	8	2	0 1 2 2 11 7	0 1	3 4 R 14	1 1	17		- 6	17	18		
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EFA Med Total		241	2	242	43	19	22	38	19	23 23	8 14 68 74	185 247	18 1 79 1		64 15		143	192	5 1	1 17 6
P MCBH	1.75	1288	0.0	110 0	329	113	118	164	5	116 124	01 4	180 247	31 5	28	0 (	0	28	41	7 7	37 37
P Pearl Harbor	1.87	140	25.	239 3			17		14	5 7	5 11	35	1 5	. 89		19	113	125	$\overline{}$	
P Kaho'olawe P Marianas	2 0 3	0.0	46.5	46 5 87 D	3.5	- 5	6	- î	5	10 6	0 4	14 12	5 4		- 1	32	53	69		
P Singapore	1 13	0.0	0.0	16.6	4.5 31.8	1	0		0	1 0	0 0	0 0	0 0		2 0	1.2	- 5	- 2	+	+
P Diego Garcia P Theiland	1 09	188	0.0	2.3	0.4	1	0	1	0	1 0	0 D	0 0	1 0	1	D C	0	4	2		
P OICC FFYORD P Sasabo	1 52	:: 5	- 11	14 5	23.0	3	4	- 1	3	1 1	0 1	9 8	1 3		6 .	11	31	35	+	1
P Oxnawa	1 52	25.5	5.5	310	28 0	٠.	3	- 5	7	. 3	3 2	84 6	2 2	25	- 4	14	29	32	=	
P Alsug: P liwakure	1 66 1 59	9.0	1 6	10.6		+	-	11	1	0 1	0 1	3 2	0 1	1	1 0	3	- 6	- 0		
P  Chinhae	113	1.0	0.0	10	0.2	.0_	. 0	0	0	0 0	0 0	3 2 0 0 1 0	0 0		0 0	0	0		-	
P MILENG PAC Total		496	125	2 9	233	34	47	67	60	81 50	B 30	86 99	20 3	3 267	80 6	108	323	404	0 0	0 1 0
SW Barstow	1 17	130	120	25 0 16 5	4 D	10	3	3.0	1	10 3 30 2	10 1	15 6	1 2	6	2 5 1.0	2	10	20	++	1
SW China Lake SW Coronado	1 19	13 5 31 9	10.1	420	14 8	40	4	50	3	10 4	0.5 3	15 8	2 3	14	20 20	Ĭ	18	33	1	
SW El Centro SW Miramar	1 24	6.9 59.0	8.0	9 6 65 0	8 2 3 5	3.0	- 6		3	30 6	20 4	0 5 2	3 4		10 20	2	24 57	37	1	
SW Camp Fandeton	1 19	1100	10 7	120 7	37	10.0	9	160	7	10.0 9	30 5	11, 18	1 6	51	4.0 2.0	2	57	56 34	1	2 1
SW Ventura County SW Hindoeport	1 12	17	120	2 2	10 B	50	5	0.50	6	200 0	20 3	0	3 6		20 20	ő	3	- 1	1 00	
SW San Diego SW Pont Loma	119	50 7 17 0	6 D	24 9	9.2	30_	. 5	6.0	5	75 6 20 3	175 4	1 75 12	4 4	18	3.5 1.0 2.0 1.0	4	17	16	-	1
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SW Los Angeles SW 29 Parms	1.35	20 3 55 8	0.7	20.4 56.5	3 i	3.0	4	50 4.0	+	20 4	30 3	4 9	2 3		1.0 1.0	3	20	30		.0 1
SW rume	1 15	20 3 55 8 24 8 448	40	28 6	6 1 3 7 79	20	3	2.5	2 38	175 3	05 2 17 28	3 75 6	1 2 23	12	15 10 24 14	277	253	18		1 4 2
NW Gremerton	1.16	17.82	59	23 12	7.6	4	7		7	2 2	2 1	21 5	. 11 . 2	12	12 2	4	28	18	T	
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NW Falon	119	129	4.6	17.5	14 1	2.0	2	4.0	1	10 2	10 1	3 4	2 1	13	1	7	14	17		
NW Swerdale EFA NW Total	118	42 22 100	4 37	46 59 134	30	14	12	D	10	7 13	3 3	3 9 11 20	2 3	15 36 87	32 3		27 B2	111	0 0	000
CW Concord														12		F.		- 14	1	$\blacksquare$
CW San Francisco CW Lembore	1 25	450	7.0	46 7 56 4	31	10	5	40	3	40 4 25 5	10 2 05 3	3 B 5 10	3 3	19		1	19	32		
CW M omeray	116	11.6	21	13 9	5 2 0 0	10	3		1 3	30 4	10 2	3 7	0 1	10		2	10	11		+
CW Travis  EFA CW Total	1 24	147	13	100			13	16	11	11 14	3 8	13 29	7	9 69	0	4	59	83	0 0	0 0 0
SWEST TOTAL		704	114	217	157	61	71	87	60	86 78	31 45	20 140	38 6	331		74	404	822	0 1	1 4 2



## APPENDIX B: STUDY QUESTIONNAIRE

### Interview Questions for Non-NAVFAC Organizations

- Describe your firm's organizational structure with emphasis on the contracts and construction management department. Please include a diagram.
- 2. With as much detail as possible, please describe the duties of each member of the post-award construction management (CM) team (e.g. project manager, contract specialist, quality assurance).
- 3. For 2000, 2001, and 2002, provide the following data: 1) total work-inplace dollars and 2) quantity and skill of personnel devoted to post award construction management.
- 4. Describe the "flow" of funds within your organization to award or modify a construction contract. Is there a member of the CM team with contractual authority to award or modify a contract?
- 5. How does your firm determine "adequate" staffing for the CM team? Describe any algorithms or methods used? How often is the algorithm or method used to review CM staffing?
- 6. With respect to question four, was your firm's staffing method utilized during the 2000, 2001, and 2002 years? If no, please explain why staffing methods were not utilized or provide details of the method used and the reason(s) for changing to the existing method.
- 7. If CM staffing is determined to be inadequate, what measures are taken to ensure adequate staffing and how quickly is the issue addressed?
- 8. With respect to the CM team, does your firm utilize a permanent home office, field office(s), or both? Provide location and size for all field offices established during 2000 to 2002.

## APPENDIX C: THE U.T. SYSTEM DATA

Six Year Activity/Staffing Analysis
BUDGET ACTIVITY R

	Six Year Staff History	History				BODGE			ACTIVIT			SOLICE	
	OFPC	OFPC		OFPC OFPC Confract Total	Total		:		Total Dollars			\$ Processed	\$ Processed Active Project \$
	Budget FTE	FTEFIIED	% Vacant	FTE Filled	Filled	Hojected	Actual		Processed Ac	Active Projects CIP	dis	Fer Filled Staff	Per Filled Staff Per Filled Staff
FY 98	74	29	9.5%		67.0	\$5,572,000	\$4,924,000	FY 98	\$216,000,000		\$1,720,000,000	\$3,223,880.60	
FY 99	76	77	-1.3%		77.0	\$5,961,000	\$5,424,000	FY 99	\$182,000,000		\$1,860,000,000	\$2,363,636.36	
FY 00	78	80	-2.6%		80.0	\$6,979,000	\$6,379,000	FY 00	\$290,000,000	\$1,358,000,000	\$1,850,000,000	\$3,625,000.00	\$16,975,000
FY 01	91	98	5.5%	2.5	88.5	\$7,727,000	\$7,111,000	FY 01	\$320,000,000	\$2,060,000,000 \$2,880,000,000	\$2,880,000,000	\$3,615,819.21	\$23,276,836
FY 02	122	110	9.8%	5.5	115.5	\$11,087,000	\$9,998,000	FY 02	\$360,000,000	\$2,480,000,000	\$3,610,000,000	\$3,116,883.12	\$21,471,861
FY 03	135	119	11.9%	10.5	129.5	\$11,989,000	\$10,480,000	FY 03	\$450,000,000	\$2,815,000,000	54,150,000,000	\$3,474,903.47	\$21,737,452



### JOB DESCRIPTION

	Effective Date: September 1, 1996
Job Title	Resident Construction Manager
Job Code Number	0572
FLSA Category	Exempt

o provide leadership and direction to construction contractors, chitects, and engineers in the design and construction of facilities for imponent institutions.
schelor's degree in architecture or engineering with a minimum of 3 ars experience in construction contract administration.

	Job Functions
Number	Description
1.	Administer contract requirements of construction contracts and agreements.
2.	Provide guidance, support, and leadership to the construction team.
3.	Supervise employees.
4.	Monitor and promote project construction schedule and fiscal status.
5,	Manage construction change order process.
6.	Manage resolution of contractor questions regarding project design and on-site conditions.
7.	Interface with users and institution's administration.

This job description in no way states or implies that these are the only duties to be performed by the employee occupying this position. The incumbers is expected to perform other duties necessary for the effective operation of the department. Any qualifications to be considered as equivalents in lieu of stated minimums require prior approval of the Human Resources Director.



### JOB DESCRIPTION

	Effective Date: September 1, 1996
Job Title	Contract Manager
Job Code Number	0527
FLSA Category	Exempt

Job Purpose	To establish, maintain and review contract document records for all construction projects for U. T. System.
Education and experience required including training, registration, and licensure.	Bachelor's degree in architecture or engineering with a minimum of 5 years project management experience.
Supervision provided to others.	No

Job Functions		
Number	Description	
1.	Prepare monthly status reports.	
2.	Review and process all contractor certificates for payment.	
3.	Maintain current and historical records of contract and cost data for all projects.	
4.	Coordinate insurance certificate requirements with contractors and insurance providers.	
5.	Review construction agreements, bonds, insurance and attachments prior to final execution,	
6.	Prepare the "Notice to Proceed" and related documents upon contract approval.	

This job description in no way states or implies that these are the only duties to be performed by the employee occupying this position. The incumbent is expected to perform other duties necessary for the effective operation of the department. Any qualifications to be considered as equivalents in lieu of stated minimums sequire prior approval of the Human Resources Director.



### JOB DESCRIPTION

		Revised: September 1, 1999
Job Title	Project Manager	
Job Code Number	0563	
FLSA Category	Exempt	

Job Purpose	To provide management and direction in assisting component institutions and design professionals on their programs, planning, contract administration, and construction observation of facility construction projects.
Education and experience required including training, registration, and licensure.	Bachelor's degree in architecture or engineering with a minimum of 3 years project management experience. Registration as Professional Architect or Engineer is required or attainable.
Supervision provided to others.	Yes

Job Functions .		
Number	Description	
1.	Manage major capital projects by providing project coordination and conflict resolution pullance	
2.	Support component institutions in pre-project planning activities.	
3.	Monitor and evaluate project controls used and take definitive action.	
4.	Provide support and guidance to Resident Construction Manager, Inspectors, and component institution staff in management of construction activities.	
5.	Supervise contract administration activities.	
6.	Review design and construction documents for compliance with project requirements.	

This job description in no way states or implies that these are the only duties to be performed by the employee occupying this position. The incumbent is expected to perform other duties necessary for the effective operation of the department. Any qualifications to be considered as equivalents in lieu of stated minimums require prior approval of the Human Resources Director.



### JOB DESCRIPTION

	Effective Date: September 1, 1996
Job Title	Construction Inspector
Job Code Number	5055
FLSA Category	Non-exempt

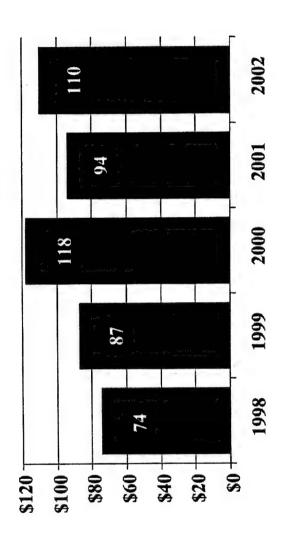
Job Purpose	To provide skilled, professional duties in the inspection and/or coordination of construction or maintenance of projects.
Education and experience required including training, registration, and licensure.	High school diploma or GED, equivalent with a minimum of 5 years experience in maintenance and construction.
Supervision provided to others.	No

Job Functions		
Number	Description	
1.	Review and approve architectural, civil, structural, plumbing, electrical, and mechanical shop drawings and other submissions.	
2.	Inspect work for compliance with contract provisions.	
3.	Maintain job records, text reports and similar documentation.	
4.	Assist the Resident Construction Manager in solving problems involving architectural, civil, structural, plumbing, electrical, and mechanical matters.	
5.	Coordinate and monitor material testing and air balance testing.	
6.	Review and approve monthly requests for payment sent from contractors.	

This job description in no way states or implies that these are the only duties to be performed by the employee occupying this position. The incumbent is expected to perform other duties necessary for the effective operation of the department. Any qualifications to be considered as equivalents in lieu of stated minimums require prior approval of the Human Resources Director,

## APPENDIX D: TAMU SYSTEM DATA

The Texas A&M University System Construction Expenditures By Fiscal Year in Millions



### THE TEXAS A&M UNIVERSITY SYSTEM POSITION DESCRIPTION

HR 182 (2/01)

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eneral Instructions:

An Position Description form is used to record the duties, responsibilities, qualifications sought, and fiscal impact of classified and nonclassified staff positions. This information is the basis for determining the title, salary rate, and Fair Labor Standards Act exemption status for staff positions.

To achieve these purposes, it is essential that detailed and exact information pertaining to current duties, responsibilities, and qualifications be

A. Member(s) of TAMU System: System Administrative and General Offices		artment or Division: es Construction Division
C. Member ADLOC Account No.:	D. Sout	rce of Funds by Type (E&G, Auxiliary, Restricted, etc.):
01-271130	Designs	
E. Member Funding Account No. (s) & Accoun-	nt Title(s): F. Dura	ation of Position:
01-271130. Facilities Construction Division	Perman	
G. Piace of Work or Headquarters (Bldg. Name	and Room No.): H. Emp	ployee's Name (leave blank if position is new or vacant):
Facilities Planning and Construction - Room 1	120	
Present Title Construction Project Manager		Determines FLSA Exemption Status  Title Code 9059
PIN 800128 Present Salar	ry Per	(hour/month/year)
Proposed Title		Title Code
	Per (hour/month/y	vear)
Proposed Salary		
		travel, clerical support, etc. (describe and give amount):
Secondary costs that will be incurred as a res	esult of this action such as equipment, to	travel, clerical support, etc. (describe and give amount): supervised, indicate "None":
Secondary costs that will be incurred as a rest.  C. Titles and number of employees supervised.  The to 6 - Supervisory Construction Inspec	sult of this action such as equipment, t by this position. If no employees are sector. Senior Construction Inspector	travel, clerical support, etc. (describe and give amount): supervised, indicate "None": (4). Construction Inspector (1)
Secondary costs that will be incurred as a rec.  Titles and number of employees supervised. Up to 6 - Supervisory Construction Inspect D. Is the position of a security sensitive nature vehicle?	sult of this action such as equipment, t by this position. If no employees are sector. Senior Construction Inspector	travel, clerical support, etc. (describe and give amount): supervised, indicate "None": (4). Construction Inspector (1)
Secondary costs that will be incurred as a rec.  Titles and number of employees supervised Up to 6 - Supervisory Construction Inspect Is the position of a security sensitive nature (vehicle)?  Yes	esult of this action such as equipment, to by this position. If no employees are sector, Senior Construction Inspector (i.e. does it handle cash or System fun	travel, clerical support, etc. (describe and give amount): supervised, indicate "None":

20 hrs. Telephone 1 hrs. Copier 10 hrs. Fax Machine
1 hrs. 1 hrs. hrs. Calculator

F. Qualifications required in filling a future vacancy in this position. Keep the position in mind rather than the current or potential occupant. Physical requirements should be indicated in Section V of this form.

	Necessary Qualifications	Preferred Qualifications
Education:	Bachelor's Degree in Architecture, Engineering Building Construction or equivalent experience	
Experience:	Minimum of ten years in construction with experience as Project Management or middle management experience	
Licenses, certificates or registration:		Registration as a Professional Engineer or have the appropriate education and experience necessary to apply for registration. AIC certification.
Special knowledge, abilities and skills:	Knowledge of construction principles and practices, ability to read and interpret Contract Documents and the ability to maintain effective relationships with A/E's and Contractors	
er requirements or	Ability to multi-task and work cooperatively with others.	

## THE TEXAS A&M UNIVERSITY SYSTEM POSITION DESCRIPTION

HR 182 (2/01)

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The Position Description form is used to record the duties, responsibilities, qualifications sought, and fiscal impact of classified and nonclassified staff positions. This information is the basis for determining the title, sulary rate, and Fair Labor Standards Act exemption status for staff positions. To achieve these purposes, it is essential that detailed and exact information pertaining to current duties, responsibilities, and qualifications be accurately recorded on this form.

accurately recorded on this form.					
A. Member(s) of TAMU System	:	В, Д	epartment or Di	vision:	
System Administrative and				istration Division	
C. Member ADLOC Account No	o.:	D. S	ource of Funds	by Type (E&G, Auxiliary,	Restricted, etc.):
01-271110		l D	esignated	• • • • • • • • • • • • • • • • • • • •	
E. Member Funding Account No	. (s) & Account Titl	le(s): F. D	uration of Positi	on:	
01-271110, Facilities Admin			ermanent		
G. Place of Work or Headquarte Facilities Planning and Con		Room No.): H. E	imployee's Nam	e (leave blank if position i	s new or vacant):
II. General Information: A. This Questionnaire: (check by Establishes A New Position  Present Title Director, Facilities  PIN S00075  Proposed Title	Changes A Buc	ision	Job Description Title	Determines FLSA	a Exemption Status
Proposed Salary		Per (hour/mont	h/year)		
Secondary costs that will be in None	ncurred as a result o	of this action such as equipmen	t, travel, clerical	support, etc. (describe an	d give amount):
1-Assistant Director, Const	ruction Division; 3-	is position. If no employees a Construction Project Manag Construction Supervisor; 1-A	ers; 1-Mechani	cal Construction Supervi	isor;
where funds could be diverte	d from System accou	ioes it require regular handling unts for personal use; does the ld result in alteration, deletion	position have ac	cess to master keys to sen	sitive work areas; or is
E. Machines or equipment used positions the combined total		licate hours during an average pproach 40 hours:	week that each p	piece of equipment is actual	ally used. For most
Telephone	10 hrs.		hrs.		hrs.
Computer	10 her		her		L

F. Qualifications required in filling a future vacancy in this position. Keep the position in mind rather than the current or potential occupant. Physical requirements should be indicated in Section V of this form.

	Necessary Qualifications	Preferred Qualifications
Education:	B. S. in Construction Management, Engineering or Architecture	
Experience:	Minimum of fifteen years experience in managing large construction programs.	
Licenses, certificates or registration:		Registered professional engineer or architect
ecial knowledge, lities and skills:	Must be willing to travel, physically able to conduct on- site inspection for construction projects and work with people within a structured organization	
Other requirements or other factors:	Ability to multi-task and work cooperatively with others.	

Page 1

# THE TEXAS A&M UNIVERSITY SYSTEM POSITION DESCRIPTION

HR 182 (2/01)

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General Instructions:

The Position Description form is used to record the duties, responsibilities, qualifications sought, and fiscal impact of classified and nooclassified staff positions. This information is the basis for determining the title, salary rate, and Fair Labor Standards Act exemption status for staff positions. To achieve those purposes, it is essential

		15.5		
A. Member(s) of TAM		B. Department or Division: Facilities Planning Division		
	ative and General Offices			
C. Member ADLOC A 01-271120	secount No.:	D. Source of Funds by Type (E&G, Auxiliary, Restricted, etc.):  Designated		etc.):
	ccount No. (s) & Account Title(s):	F. Duration of Position:		
271120 FPD		Permanent		- 1
G. Place of Work or H	eadquarters (Bldg, Name and Room No.): and Construction Building	H. Employee's Name (les	ve blank if position is new or vac	ent):
il. General Inform				
	(check box and complete title(s), title code(s),	PIN and salary(ies) as appropriate)		
Establishes A New 1	Position	☑ Updates Job Description ☐	Determines FLSA Exemption	Status
Present Title Architec	tural Project Manager	Title Cod	e 8680	٠.
PDV 500151	Present Salary	Per (hour/mont)	h/year)	
Proposed Title		Title Cod	le	
Proposed Salary	· Per	(hour/month/year)		
			one see (decoribe and object amon	·**
None	at will be incurred as a result of this action such			int):
Nome	of employees supervised by this position. If no			
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Page 1

# THE TEXAS A&M UNIVERSITY SYSTEM POSITION DESCRIPTION

HR 182 (2/01)

eneral instructions:  The Position Description form is used to record the duties, respectation formisms in the basis for determining the To achieve these purposes, it is essential that detailed and exact accurately recorded on this form.	onsibilities, qualifications sought, and fiscal impact of classified and nonclassified to title, salary rate, and Fair Labor Standards Act exemption status for staff position t information pertaining to current duties, responsibilities, and qualifications be
A Manharia of TAMI System	B. Department or Division:

A. Member(s) of TAMU System: System Administrative and General Offices C. Member ADLOC Account No.: 01-27130 E. Member Funding Account No. (a) & Account Title(s): 01-27130, Facilities Construction Division G. Place of Work or Headquarters (Bidg. Name and Room No.): Facilities Planning and Construction - Room 120	B. Department of Division  D. Source of Funds by Type (E&G, Auxiliary, Restricted, etc.):  Designated  F. Duration of Position:  Per manent  H. Employee's Name (leave blank if position is new or vacant):
Changes A Budgeted Position  Bestablishes A New Position ☐ Changes A Budgeted Position ☐  Present Title Senior Construction Inspector	and salary(ies) as appropriate)  Updates Job Description Uetermines FLSA Exemption Status  Title Code 9463
PIN S24095 Present Salary	Per (hour/month/year)
Proposed Title	Title Code
Proposed Status y	our/month/year)
Secondary costs that will be incurred as a result of this action such as o	quipment, travel, clerical support, etc. (describe and give amount):

Titles and number of employees supervised by this position. If no employees are supervised, indicate "None": C.

NONE

D. Is the position of a security sensitive nature (i.e. does it handle cash or System funds, have access to sensitive files or records, or drive a System vehicle)?

YES

E. Machines or equipment used by this position. Indicate hours during an average week that each piece of equipment is actually used. For most positions the combined total usage will seldom approach 40 hours:

Computer	hrs. Telephone	10 hrs.	Fax Machine	2 hrs.
Calculator	hrs. Copier	2 hrs.		hrs.

Qualifications required in filling a future vacancy in this position. Keep the position in mind rather than the current or potential occupant. Physical requirements should be indicated in Section V of this form.

	Necessary Qualifications	Preferred Qualifications
Education:	Bachelor's Degree in Architecture, Engineering or Building Construction. Appropriate experience may be substituted for education	
Experience:	Minimum ten years in construction related work. Bachelor's Degree in Architecture, Engineering or Building Construction may be substituted for four years of experience	
Licenses, certificates or registration: Special knowledge, chilities and skills:	Knowledge of construction principles and practice. Ability to read and interpret Contract Documents and the ability to maintain an effective relationship with project AE's, contractors and users.	Travel to Kingsville
Other requirements or other factors:	Ability to multi-task and work cooperatively with others.	

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## **APPENDIX E: THE DUPONT COMPANY DATA**

### CM - Construction Management

- FC&S DuPont Construction Management, DuPont (owner) CM roll work force
- CMC Construction Management Contractor, CM contractor located at the site, part of the EPCM contractor for the project

Basis – typical large project, construction strategy mainly lump sum contracting, but usually with some amount of cost reimbursable contracting methods

- 1. Describe DuPont's CM Organizational Structure
  - DuPont business owner of the facility being built, science company
    - DuPont Global Services provides a range of services to the owner businesses
      - DuPont Engineering, Facilities & SHE (safety, health, environmental) services Engineering part
        - DuCap (DuPont Capital Asset Productivity) Project planning & execution
          - DuPont FC&S (Facilities construction & support) Construction Management
            - Construction Managers/Leads
            - Construction Engineers
            - Construction Safety Professionals
            - Construction Craft Consultants
              - E&I (Electrical, instrumentation, controls) Consultants
              - Mechanical (Equipment, piping) Consultants
              - CSA (Concrete, structural, architectural, civil) Consultant
              - Quality Consultant
            - BC&S (Business Controls & Solutions) Construction Business services
            - CMC Construction Management Contractor
              - CMC CM staff
              - Lump Sum Contractors CM
                - Lump Sum Contractors CM Staff

### 2. Describe duties of Construction Management Staff

### DuPont FC&S CM

- Construction Manager/Lead full time project site location
  - Has total construction responsibility for the project
  - Involves the part time DuPont CM staff as needed
  - Provide oversight of the Construction Management Contractor
  - Provide renewal training to the Construction Engineer
- Construction Engineer full time project site location
  - Assist the DuPont Construction Manager
  - Renewal
- Safety Professional Consultant part time regional location
  - Audit, set expectations, and provide training/assistance to the Construction Management Contractor
- Construction Business Services Consultant part time regional location
  - Audit, set expectations, and provide training/assistance to the Construction Management Contractor
  - Execute payments to the construction contractors
- Quality Craft Consultant part time regional location
  - Audit, set expectations, and provide training/assistance to the Construction Management Contractor
- Civil, structural, architectural Craft Consultant part time regional location
  - Audit, set expectations, and provide training/assistance to the Construction Management Contractor
- Mechanical Craft Consultant part time regional location
  - Audit, set expectations, and provide training/assistance to the Construction Management Contractor
- Electrical and Instrumentation Craft Consultant part time regional location
  - Audit, set expectations, and provide training/assistance to the Construction Management Contractor

### Construction Management Contractor CM

- Construction Manager full time project site location
  - Has total responsibility for his staff. Also responsible for management of the construction contractors. Reports to the DuPont FC&S Construction Manager
- Construction Engineer full time project site location
  - Assist the construction manager.
  - Scheduler
  - Trouble shooter
- Safety person full time project site location
  - Responsible for implementation of the project's construction safety plan

- Contract administrator full time project site location
  - Responsible for all official communications with the construction contractors
- Cost control person full time project site location
  - Responsible for cost control of all construction costs
- Receiving person full time project site location
  - Receives and issues to the construction contractors equipment and materials procured by the engineering/procurement group
- Civil, structural, architectural superintendent full time project site location
  - Field contractor administrator for the civil, structural and architectural construction contractors
- Mechanical superintendent full time project site location
  - Field contractor administrator for the mechanical construction contractors
- Electrical and Instrumentation superintendent full time project site location
  - Field contractor administrator for the electrical and instrumentation construction contractors
- Quality Supervisor full time project site location
  - Responsible for implementation of the project's construction quality plan

### Lump sum contractors CM

- Construction Manager
- Safety person
- Quality person
- Rest varies depending on type and size of contract
- 3. Total Yearly Construction volume, and CM staff quantity and skill
  - \$ Value
    - 2000 \$1.9 billion
      2001 \$1.5 billion
      2002 \$1.4 billion

### CM staff

- FC&S CM staff
  - 100-125 DuPonters
  - Vast majority with over 20 years experience and highly skilled
- CMC contractor staff
  - Varies by project and by CMC contractor, say 3 to 4 times the number of CM DuPonters, or 10% of the lump sum contracts value, say 300-400.
  - Skill varies, not always at expectation level
- Lump sum CM staff
  - Varies greatly by lump sum contract size and type

• Skill varies greatly, usually not at expected level

### 4. Describe flow of funds

- Project Authorization
- EPCM production design
- EPCM issues design package for review
- FC&S and CMC review design package for quality and completeness
- EPCM issues bid package to lump sum contractors for bids
- EPCM evaluates bids and issues recommendation to FC&S CM
- With recommendation agreed to, EPCM awards contract. For large dollar values, DuPont Sourcing approval is required. DuPont Sourcing is part of DuPont Global Services but separate from DuPont Engineering.
- Construction contractor invoices CM contractor for progress payment in alignment with contract requirements
- CMC evaluates invoices and approves
- DuPont construction manager approves invoices
- Approved invoice sent to regional DuPont BC&S (accounts payable) who inputs into DuPont system for payment
- DuPont issues payment to lump sum contractor
- Contract alteration
  - Contract award
  - FRI (request for information) is generated by construction contractor or by CMC contract administrator to document all communications, examples:
    - New design
    - Design change
    - Clarifications
    - Claims
    - Information -changes to work week
    - Schedule changes
  - CMC contract administrator issues CCR (contract change request) to the construction contractor, requesting quote for the change and schedule impact
  - Construction contractor submits price and schedule impact to the CM contractor contract administrator
  - CMC contract administrator reviews with appropriate CM staff members and design, and if agreed to, submits XWO (extra work order) for approval by CM construction manager
  - If approved, XWO submitted to DuPont construction manager/leader for approval
  - If approved, XWO is issued to construction contractor
  - The contract, at any point in time, includes the original authorized contract, plus all authorized XWO's. If the change is significant, the contract will be altered after going through the above process. Then, the contract, at any

- point in time, includes the altered authorized contract, plus all authorized XWO's, not included in the alteration.
- Construction contractor invoices CMC for periodical progress payment as shown above.
- 5. The DuPont construction manager/lead develops the CM staffing plan for the project, to include both DuPont CM staff and the CMC CM staff. DuPont keeps historical data on CM staff costs as a per cent to compare each project to.
- 6. Staffing Method
  - 2000 Same
  - 2001 Same
  - 2002 Same
- 7. Inadequate CM staff size If the DuPont construction manager determines that the CM staff is undersize, he will ASAP:
  - Determine if the CM contractor can add staff and direct him to do so
  - Increase involvement by the part time DuPont CM consultants as needed
- 8. Construction Management Staff Location
  - DuPont CM staff location Full time project specific staff members, usually the
    construction manager/lead and the construction engineer, are located at the
    project site location, for the duration of the project. Part time regional staff
    members are located either at the home office location, or at a site location,
    permanently.
  - CM contractor staff Location Located at the project site location for the duration of their part of the project.

### **GLOSSARY**

### **NAVFAC Terminology**

Assistant Resident Engineer in Charge of Construction (AREICC).

Also known as a Project Manager, a civilian engineer designated by the ROICC to administer construction contracts.

Assistant Resident Officer in Charge of Construction (AROICC). A CEC officer (junior in rank to the ROICC) designated by the ROICC to administer construction contracts.

Civil Engineer Corps (CEC). An officer staff corps in the U. S. Navy specializing in construction management, facilities management and contingency engineering.

Engineering Field Activity (EFA). A subordinate activity of an EFD. EFA's have similar functions as EFD's but are smaller in size. There are currently seven EFA's within NAVFAC.

Engineering Field Division (EFD). The regional engineering activity responsible for facility acquisition: contract award, issue contract warrants, and provide field guidance and environmental regulation. NAVFAC is divided among four EFD's.

Field Office. A subordinate organizational element of a respective NAVFAC Engineering Field Division/Activity at the naval activity/base level. Also known as the Resident Officer in Charge of Construction (ROICC) offices. The ROICC offices execute and administer construction, facilities service and A/E design contracts.

**KO** – Contracting Officer

Resident Engineer in Charge of Construction (REICC). A civilian engineer at the Field Office level designated by the ROICC for technical support and oversight of projects.

Resident Officer in Charge of Construction (ROICC). A Civil Engineer Corps officer responsible for the overall management of the office and the administration of assigned contracts. Contracting authority is delegated to the ROICC by the Engineering Field Division/Activity. As a contracting officer, the ROICC has the authority to enter, modify or terminate a contract in compliance with the Federal Acquisition Regulation and other applicable federal laws.

Work-in-place (WIP). The value of construction, repair, and maintenance work put in place, during a specific period, including paid materials on site and certified land acquisition

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**VITA** 

Joshua Jon Gamez was born on November 26, 1974, in Corpus Christi,

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